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### Improved Bolt and Rivet Machine.

Screw bolts and nuts are indispensable in the arts and manufactures, and are in such demand that they always find a market and quick sale. The great object with mechanics and manufacturers, therefore, is to produce them in large quantities, of the best quality and workmanship.

In former times—not so very long since, either—all bolts were forged by hand. That is to say, the rods were cut the right length, collars were turned over and welded on the rods, and finally squared up to form the heads, and, after much swedging, and upsetting, and reheating, and other operations, a five-eighth bolt would at last be turned out. Hundreds—yes, thousands—of bolts are made in this way at the present time. The great wants of the trade, however, are supplied by the aid of machines, one of which we give a sample of in the engravings published herewith. It has often been urged that machine-made bolts and nuts are deficient in strength; that the heads were imperfectly formed, and that the hand-made bolts were far superior. These objections are true of some machine-made bolts, and were prominent defects in the first ones. We have, however, seen samples of the work done by these machines, and it could not be excelled. The heads are perfect, the angles and corners are as sharp and complete as any planed nut, and the material used is, we are informed, the very best.

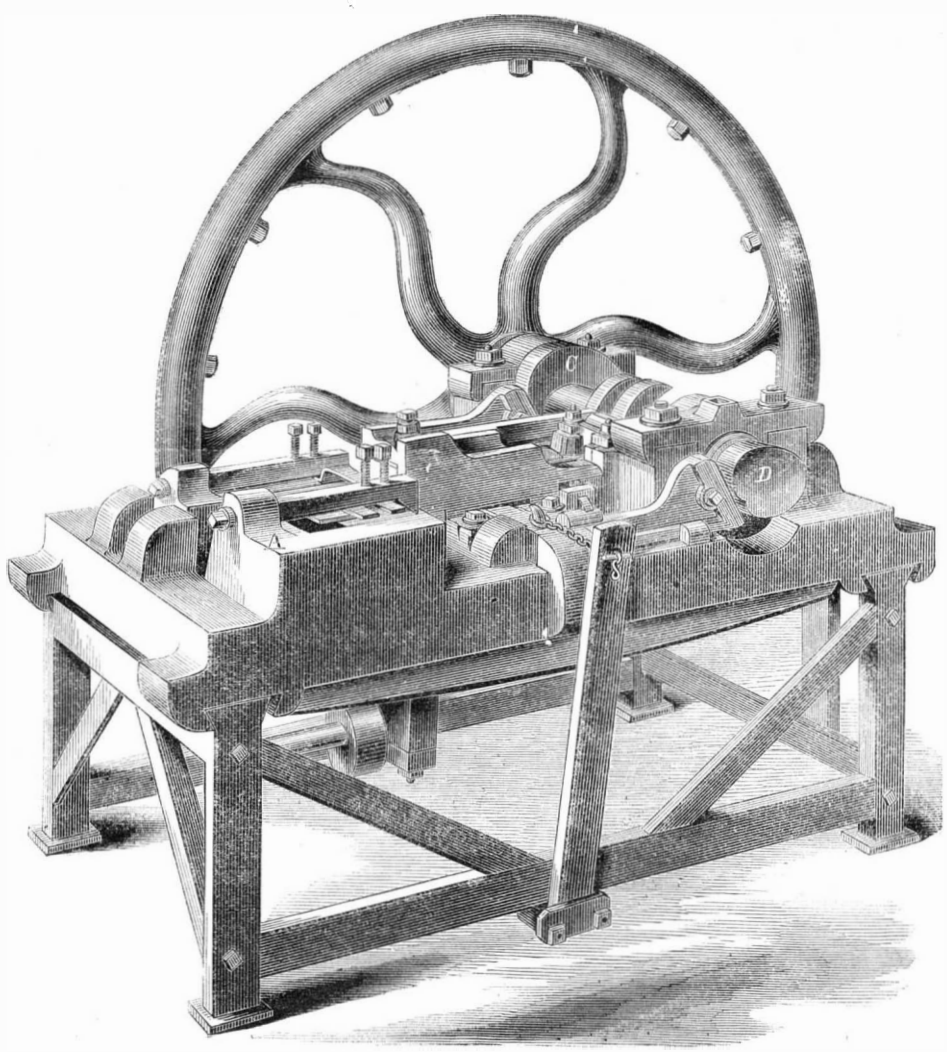
Machine-made bolts are all upset on the heads—that is to say, the end of the rod is pressed into the die that forms the head, so that it is all one solid piece. Hand-made bolts of any size are made with a head lapped and welded on them, and there is just the same difference between the strength of the two kinds as between a solid-headed pin and one formed of a coil, as they were formerly.

The details of this machine are simple, as will be seen. They consist of a pair of dies and a cam movement to cut off the rod and compress it to form the head. [See next page for plan view of machine.]

The die box is shown at A, in Fig. 1, and also the ram, B, which compresses the rod. The cam, C, gives the power for the purpose. At D is the cam which returns the ram to its position for another stroke. The whole is mounted on a strong cast-iron bed plate, secured to a wooden frame. This machine will make spikes, rivets, and bolts, of any size and shape of head. Its proportions and workmanship are good, and its general arrangement such that it can be easily kept in order.

The aim, says the inventor, has been to produce a machine of a simpler form and cheaper construction than those generally in use. In this he claims to have succeeded. Bolt makers and practical men all know that, in most cases, when a bolt fails, the weak point is found to be directly under the head, whether the work be done by machinery or by hand. Many machines make a good bolt, but deprive it of all its strength in releasing it from the dies. This objectionable feature, it is claimed, has been entirely avoided in this machine, by so arranging the movements that every bolt made from good iron will be found perfect in all respects.

This machine was patented October 11, 1864.




HARDAWAY'S BOLT AND RIVET MACHINE.

For further information address White & Butterworth, Box 292, Baltimore, Md.

[See advertisement on another page ]

### New Theory of Iron.

In a paper addressed to the Academy of Sciences, M. de Cazancourt, a proprietor of ironworks, expounds a new theory of iron. Oxides of iron, he observes, have long been considered to be degrees of oxidation of one and the same metal, always appearing under a metallic form with absolutely identical characteristics, whenever chemically pure. Hence all the difference met with in various kinds of iron are exclusively attributed to peculiar chemical composition, and they are universally classed under three heads, viz., cast iron, steel, and wrought iron, according to the quantity of carbon they usually contain. And yet certain kinds of cast iron, identical in their chemical composition, appear so different from each other, and give such opposite results in working them, that our author thinks it necessary to distinguish them in practice. On the other hand, there are sorts of cast iron presenting the same composition as certain kinds of steel, and there exist also certain sorts of steel that, if analysis is to be trusted, are not distinguishable from certain kinds of iron. Hence, in metallurgy, the chemical composition of various sorts of iron is a matter of mere secondary importance, and the real characteristic to be taken into account, according to the writer, is the degree of oxidation of the ore from which they have been extracted. Berzelius had, ere this, laid down the theory, that there were two sorts of iron metals, to which he respectively gave the names of *ferricum* and *ferrosum;* M. Cazancourt adopts this division, which represents iron under two allotropic states, just as is the case with sulphur and phosphorus. He, therefore, calls ferrosum the metal extracted from the protoxide of iron, and this, he says, has not yet been practically obtained in a state of purity, except in laboratories, through the reducing agency of hydrogen. The nearest practical approach to it is what is called bright iron, possessing great hardness and fragility. The quality of iron derived from the anhydrous peroxide is what our author calls ferricum. It yields malleable iron, but when alone is not convertible into steel any more than into bright iron. The common sorts of foundery iron are nothing but ferricum losing a part of its carbon, which it had absorbed under the influence of a high temperature.—*Galignani.*

[When we consider the extremely minute quantity of phosphorus that will materially affect the properties of iron, we cannot avoid suspecting that the differences observed are, after all, due to the presence in one case, and absence in the other, of some unobserved substance.—EDS.

OUR NATIONAL FINANCES.—We have received from the author, who signs himself "A Patriot," a pamphlet of 47 pages, on the national finances, printed by Baker & Godwin, of this city. The author is manifestly ignorant of that rudiment of his subject—the distinction between capital and currency. He imagines that the printing of $100,000,000 in paper currency will increase the capital of the country to this extent, and will reduce the rate of interest to three per cent per annum!

THE manufacture of silk was more than one thousand years in traveling into England from the shores of the Bosphorus. It had been practiced four hundred years in Italy before it crossed the Alps.

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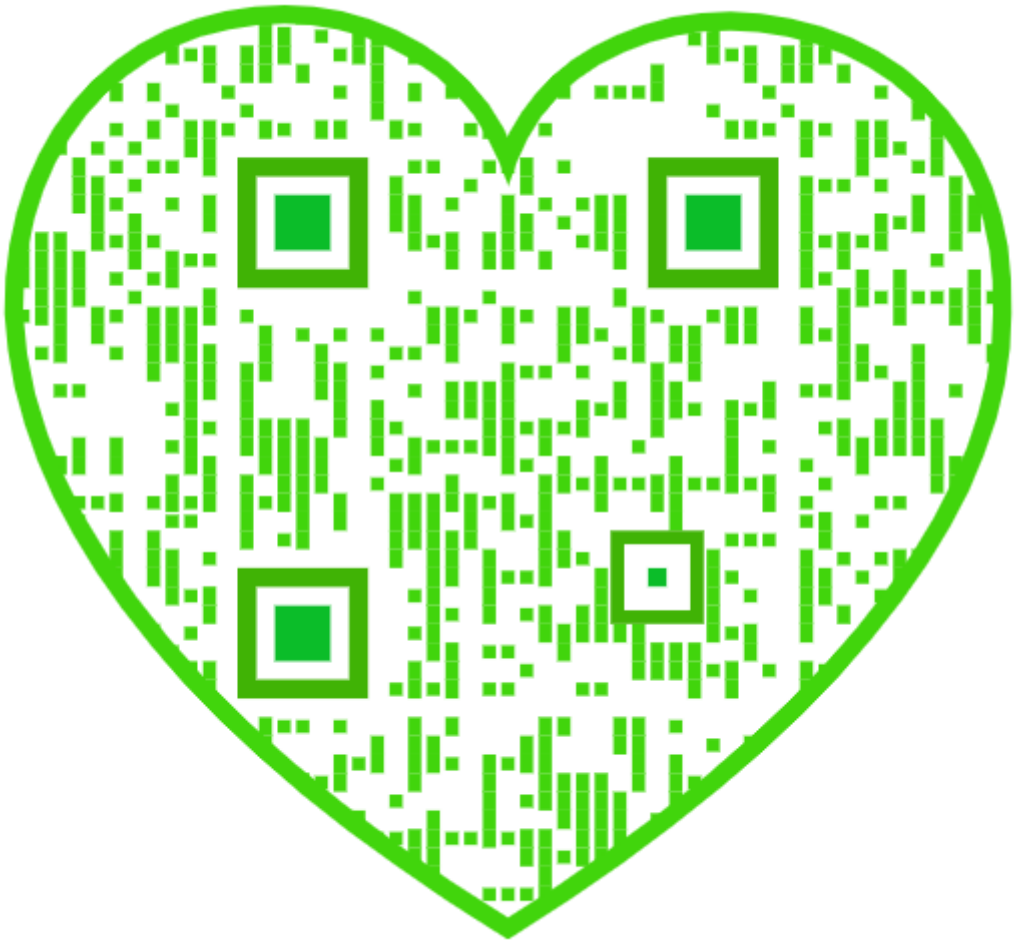


### Extraordinary Submarine Adventure.

The following has been posted at Lloyds' in reference to the sunken wreck of the *Columbian*, screw steamer, belonging to Liverpool, which unhappily foundered with all hands during the dreadful gales off the coast of France. She has a cargo on board valued at £50,000, and extraordinary efforts, it will be seen, have been made to recover it by means of divers. It forms an interesting illustration of the difficulties encountered in conducting submarine operations.

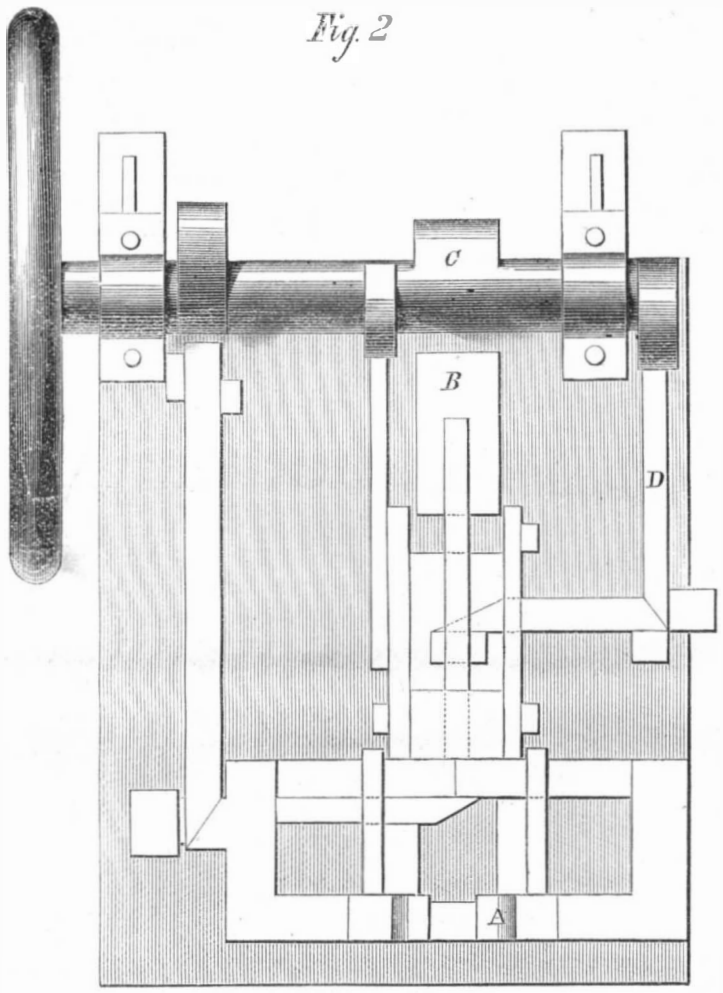
"On Thursday, the 31st of August, the *Flambeau* sailed from Molene, found the *Columbian*, and anchored over her. The ladder (which I had got made at the dockyard) was lowered, with a pig of iron at each side of its end. The diver went down, stopping at each tenth step to signal that all was going on well. As he descended he found the pressure increasing to a most painful degree. When on the last step he found the ladder was too short, the wreck being 10 or 12 feet deeper than the pilots had reported (they had stated its depth to be 29 fathoms—174 English feet). The ladder was 60 meters—197 feet—long from the top step to the lowermost one, from which the diver let himself down 10 or 12 feet below the pigs of iron. The electric lamp had been let down; but the pressure was so great that, although made of strong copper, with strengthening bars inside, it was bruised quite flat. The diver could distinguish the steps of the ladder, and even the fine line holding the lamp. He walked forward about twenty steps, sinking ankle deep in sand, and was then suddenly seized with a dizziness, and nearly fainted. Hemade his way back to the ladder, and made the signal to be hauled up. It was not perceived on board, but the people on deck, feeling uneasy at having no signal, hauled him up rapidly. The forcing pump not being sufficiently strong the air could not be sent down regularly, and the air tubes had burst. The pressure at the bottom was so great that none but such a man as this diver, who is built like a Hercules, could have withstood it. The scaphander was torn and bruised; the under garment, of strong caoutchouc cloth, was rent in several places, and its seams imprinted in the diver's flesh. The pressure on his belly was so intense as to force out his water against his will. After three-quarters of an hour's rest, and the forcing pumps and air tubes being repaired, the diver went down again. He had walked only a few steps from the ladder when the same accidents recurred. In getting back to the ladder his arm got entangled in one of the ropes attached to him. He unscrewed his dagger knife from his side, cut the rope, and was shot up with great velocity, being buoyed up by the air contained in the scaphander. His helmet struck, with a stunning blow, against the hull of the *Flambeau*, close to her keel. He had still strength enough to push himself away from the keel, and was floated to the surface, on reaching which he began to sink. Fortunately a boat was at hand, and he was picked up, brought on deck, and was taken out of the scaphander apparently dead. It was more than half an hour before he came to, after continued frictions of camphorated brandy and ether. He then slept soundly for an hour, and on awaking wanted to re-descend, but neither M. Werdermann, M. Carvallo, nor the lieutenant would allow him. I asked M. Carvallo what were his conclusions after this trial? His answer was to the following effect:—"I am certain that at a depth of 40 meters (131 feet) all salvage may be carried on without any danger. Even at 50 meters (164 feet) it may be done if proper precautions are taken; but beyond that depth the danger is too great. I have therefore made up my mind. My company abandons the salvage of the *Columbian*, and I shall leave this for Paris to-morrow morning. M. Werdermann and the diver called on me seperately yesterday evening. Both are still of opinion that the salvage is possible, but with better apparatus and more effective means, all of M. Cabirol's scaphanders and apparatus (which were those used) having been by far too weak. With powerful means, which they themselves would superintend the making, they would not hesitate to dive to the *Columbian*, and feel certain of success."—*London Engineer.*

### An English Ship Builder on the Monitors.

Mr. J. Scott Russell says of "the modern American fleet:"—

"It is a creation altogether original, peculiarly American, admirably adapted to the special purpose which gave it birth. Like most American inventions, use has been allowed to dictate terms of construction; and purpose, not prejudice, has been allowed to rule invention.

Fig. 2




HARDAWAY'S BOLT AND RIVET MACHINE.---SEE FIRST PAGE.

"The ruling conditions of construction for the inventors of the American fleet were these: the vessels must be perfectly shot-proof—they must fight in shallow water—they must be able to endure a heavy sea, and pass through it, if not fight in it.

"The American iron-clad navy is a child of these conditions. Minimum dratt of water means minimum extent of surface, protected by armor; perfect protection means thickness to resist the heaviest shot, and protection for the whole length of the ship; it also means perfect protection to guns and gunners. Had they added what our legislators exact, that the ports shall lie in the ship's side, nine feet above the water, the problem might at once have become impossible and absurd; but they wanted the work done as it could be done, and allowed the conditions of success to rule the methods of construction.

"The conditions of success in the given circumstances were these: that you should not require the sides of the ship to rise much above the water's edge; that you should not require more protection to the guns than would contain guns and gunners; that you should be content with as many guns as the ship could carry, and no more.

"But the consequences of these conditions are such as we, at least for sea-going ships, would reluctantly accept. The low ship's side will, in a seaway, allow the sea to sweep over the ship, and the waves, not the sailors, will have possession of the deck. The American accepts the conditions, removes the sailors from the deck, allows the sea to have its way, and drives his vessel through, not over the sea, to her fighting destination by steam, abandoning sails. The American also cheerfully accepts the small round turret as protection for guns and men; and pivots them on a central turn-table in the middle of his ship, raising his port high enough to be out of the water, and then fighting his gun through an aperture little larger than its muzzle.

"By thus frankly accepting the conditions he could not control, the American did his work and built his fleet. It is beyond doubt that the American monitor class, with two turrets in each ship, and two guns in each turret, is a kind of vessel that can be made fast, shot-proof and sea-proof. It may be uncomfortable, but it can be made secure. The sea may possess its deck, but in the air, above the sea, the American raises a platform on the level of the top of his turrets, which he calls his hurricane deck, whence he can look down with indifference at the waves fruitlessly foaming and breaking themselves on the abandoned deck below. His vessel, too, has the advantage, as he thinks it, of not rolling with the waves; so that he can take his aim steadily and throw his shot surely. Thus, if he abandons much that we value, he secures what he values more.

"I think I have reason to know that the American turret ships, of the larger class, with two turrets and four guns, are successful vessels; successful beyond the measure of our English estimate of their success. Like so many American inventions, they are severely subject to the conditions of use, and successful by the rigidity and precision with which they fit the end and fulfill the purpose which was their aim.

It is certain that Captain Ericsson rendered great service to his country by inventing at once, and successfully introducing a class of vessels peculiarly suited to action in their inland waters and shallow navigations; and when we consider the extreme rapidity which attended the execution of the project, we must say that the original *Monitor* was a remarkable success, and that she was a type of an entirely new class of war-ship. It is curious and instructive to observe how differently the system has been developed in America and in England: in the one case the sudden abandonment of all the conventionalities of a ship, and in the other the studious retention of old forms and ways, admitting the innovation with the geatest possible amount of reluctance and seeming aversion. But it is almost always so with the Americans, who love a thing because it is new, even without any other recommendation, and with the English, who begin by hating a novelty, whatever be its merits."

### A WOOLEN FACTORY OPERATED BY CHINESE WORKMEN.

We are informed by a gentleman from San Francisco that there is in that city a large woolen manufactory in which all the laborers employed except the overseers are Chinese. The wages paid average about a dollar a day, the hands boarding themselves, but dwellings being furnished by the employers. They are said to be very apt in learning to attend the machines, and very diligent and faithful in the performance of their labor.

The wool worked is of California growth, all grades being produced in abundance. The goods manufactured are heavy broadcloths and other styles adapted to that market. Some of the blankets are claimed to be equal to any made in the world, being of very fine wool and so heavy and of such quality as to command twenty-five dollars apiece in market. The business is said to be enormously profitable, and the works are being rapidly extended.

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## RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

*Curing Goods of India-rubber and Allied Gums.*—This invention relates to an apparatus composed of two plates, or heaters, one of which is stationary, and the other suspended from suitable screws, in combination with a jacket, the lower part of which is stationary, whereas the upper part is made to rise and fall, and which surrounds the pressing plates, partially or wholly, in such a manner, that, by admitting steam, or other suitable heating medium, to the jacket, the goods between the plates can be heated to any desired degree without coming in direct contact with the heating medium, and the operation of curing goods of india-rubber or allied gums can be effected with ease and facility. For goods the length of which exceeds that of the pressing plates, said plates are provided with longitudinal grooves, to receive suitable packing strips, which prevent the heating medium from coming in direct contact with the goods to be cured, and at the same time, by means of said packing strips, the thickness of the goods is determined. J. B. Forsyth, of Roxbury, Mass., is the inventor.

*Loom for Embroidering.*—This invention consists in the arrangement of one or more needle bars, and furnished with a series of needles to carry threads for embroidering, in combination with the batten of a loom, and with one or more pattern wheels, in such a manner, that, by the action of said pattern wheel, or wheels, the position of the needle bar, or bars, is automatically adjusted, and the embroidering threads are introduced in accordance with the pattern represented by the pattern wheel, or wheels. The invention consists, further, in the use of a series of rising and falling pins, in combination with the oscillating batten, and with suitable cams, in such a manner, that, by the action of said pins, the embroidering threads are protected, and the shuttle is prevented from running into them. The invention consists, finally, in a pattern wheel composed of a series of adjustable pins inserted into the periphery of a disk, in combination with oscillating spring arms, to which the needle bar is secured, and with a suitable mechanism for turning the pattern wheel, in such a manner, that, by the action of the pins in the pattern wheel on the spring arms, the required position is given to the needle bar and needles, and, by screwing or pushing the pins in or out, the pattern wheel can be adjusted for different patterns. J. G. Spitzli, of Millville, Mass., is the inventor.

*Machine for Cutting Straw, Etc.*—This invention relates to certain improvements in that class of machines for cutting straw, tobacco, or other similar products, in which the knives are attached to a rotating wheel, and hung upon pivots in such relation to the throat of the box that a regular shear cut is produced. The knives in this improved machine are hung on pivots, and they are governed by an eccentric disk in such a manner that the cutting edges preserve the most favorable position toward the material to be cut. A compound pressure plate, consisting of a semi-circular, self-adjusting cap and vertically sliding weight, prevents the possibility of choking: and, finally, the material to be cut is straightened out and fed to the knives in the proper direction, by the action of grooved rollers, which send the separate straws, or fibers of the material to be cut, through the mouth of the box, at right angles to the plane in which the knives revolve. Robert Leggett and Robert Gittus, of Mildenhall, Eng., are the inventors.

*Let-off and Take-up Motions for Looms.*—This invention embraces several particulars, one of which relates to the use of a balanced, adjustable lever, resting against the yarn beam for the purpose of governing the let-off motion; another relates to the manner of actuating the let-off pawl lever by means of a revolving wiper; another relates to the construction of the let-off and take-up pawl levers; another relates to the manner of adjusting those levers so as to determine their extent of motion; another relates to actuating the take-up pawl by means of a shoe on the sword; another relates to the mode of transmitting motion to the cloth beam from the ratchet wheel, which is driven by the take-up pawl lever. D. Bassett, of Killingly, Conn., is the inventor.

*Pots for Corroding White Lead.*—The object of this invention is the improvement of pots for corroding white lead, and it consists in forming, at a suitable hight within the pot, an uninterrupted circular ledge, whereon the buckles of lead are allowed to rest. This ledge is made by contracting the diameter of the lower part of the pot, or, in other words, increasing the diameter of the part above the part which forms the basin for the acid, so as to make a horizontal circular shelf, which divides the basin reserved for the acid from the space above, which is reserved for the buckles of lead. The pots are, in consequence of this construction, stronger than when made after the form in ordinary use, and they are more easily cleaned. The buckles rest upon the ledge, which furnishes a broad surface for them to rest upon, so that they cannot easily be displaced, or be crushed, and broken down, and forced into the acid. J. H. Chadwick, of Boston, Mass., is the inventor.

*Knitting-machine Needles.*—This invention consists of an improved form of the parts of a knitting-machine needle, by means whereof compactness, effectiveness, and durability are secured in a profitable degree. One point relates to the manner of attaching a latch or caster to a knitting needle, by which the operation of the caster is simplified. Another relates to the construction of the hook of the needle, and the manner of combining the caster therewith, by which an easy adjustment of the device for operating the caster is permitted. Another relates to the peculiar construction and combination of the parts, by means of which the caster may remain in the same position from the time it closes the hook until the needle has completed its backward movement, and moved forward again far enough to cause the front point of the caster to enter the loop. Isaac Wixom Lamb, of Rochester, N. Y., is the inventor.

*Dessicating Eggs.*—The object of this invention is to dessicate eggs, tomatoes, and other substances, for preservation, and also for transportation to distant places, and in climates and under conditions which are unfavorable for their preservation in their natural state. It consists in the use of rotating surfaces, heated by hot water or other liquids, or by fluids, on which surfaces the substances are received and dried, and from which they are removed, dessicated, before the revolution of such surfaces is completed; the selection of the heating medium being determined in part by the degree of heat which the substance to be dessicated can bear without injury to its character and quality. Thomas H. Quick, of New York City, is the inventor.

*Tanning Apparatus.*—This invention relates to a new apparatus by which the time required for tanning leather has been reduced from months to hours; that is to say, a calf's skin may be thoroughly tanned in an hour, and an ox's hide in twenty four hours. And it consists in passing the skins through a series of pairs of rollers placed beneath the surface of the tanning liquor, within the vat; by the action of which rollers the spent liquor is squeezed out of the hides to be replaced by fresh liquor during the automatic passage of the hides to the next pair of rollers, by which, after having imparted its tannin to the hide, it is in turn expelled. By an ingenious and simple arrangement of machinery the inventor is enabled to carry his invention into practical effect in a convenient and satisiactory manner. Prof. H. W. Adams, of Irvington, N. J. is the inventor.

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FISH IN ARTESIAN WELLS.—M. Desor, a Swiss naturalist, has investigated and confirmed the statement that small fish have been found in Algerian artesian wells two hundred feet deep. These fish belong to the carp species. They are healthy, and have fine, large, and perfect eyes. Subterranean fish are usually blind, on account of the uselessness of eyes to such creatures.

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AN immense deposit of black marble, equal to the Belgian, and superior to the Irish, has been found near Williamsport, Pa. It is the only one known in America, and a company has been formed to work it upon an extensive scale.

## AN INVENTION WORTH TEN THOUSAND DOLLARS A DAY.

Mr. J. O. Woodruff, of Albany, N. Y., has invented a method of saturating barrels with solutions, to make them retain their contents, which is so effective in its operation, and which so cheapens the cost of barrels, that it has been pronounced by one of the large petroleum dealers of this city worth $10,000 per day to the county of Venango alone, a county that furnishes 10,000 barrels daily for the petroleum district of Pennsylvania. Mr. Woodruff, being offered a large fortune, cash in hand, for his patents, by a company of shrewd, practical men, could not resist the temptation to accept it, leaving to the company the great revenues which the invention is expected to yield.

It is well known that petroleum has greater facility for passing through capillary pores than any other liquid; if put into an ordinary wooden barrel it quickly runs out through the heads and staves. Many efforts have been made to prevent this waste. The common plan is to line the barrel with a thin coating of glue, or a composition of glue and other substances; but this plan is only partially successful. The leak is still so great that the cars which bring the petroleum are saturated with the oil, and the cellars in which it is is stored become filled with vapors, giving rise to fears of explosions and conflagrations.

Mr. Woodruff's method is to heat the barrels in order to expel the sap and open the pores; then, while they are hot, he pours in a sufficient quantity of the saturating liquid, and subjects the interior to the action of compressed air, at the same time revolving the barrel so as to spread the liquid completely over the interior surface. The heat keeps the saturating material very fluid, and the compressed air forces it into the opened pores. As the wood shrinks on cooling it closes upon the hardened material, making the cask not only liquid, but air tight.

The great value of this invention is in reducing the cost of barrels. At persent, petroleum and alcohol barrels are made of rived staves only, but extensive trials have shown that when Mr. Woodruff's saturating process is employed, perfectly good barrels can be made with sawed plank. As a barrel made of rived stuff costs $1 70, while one made of sawed plank costs only 60 cents, the saving in expense is $1 10 on each barrel—a saving for a single county of more than $10,000 every day. The patents for this invention were obtained through the Scientific American Patent Agency, and we shall soon publish full illustrations of the apparatus employed.

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### Pharaoh's Serpents.

Messrs. Olden & Sawyer, of No. 246 Canal street, have sent us a few of the serpents' eggs that they are making. On placing one of the little cones on our safe, and setting fire to it, the snake began to crawl out amid the wonder of the whole office, and it seemed as if the viper would never stop rising. We give the chemistry of these in another column. They are put three in a box, and sold for fifty cents per box.

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A FORMIDABLE TITLE.—Our co'temporary—the *Lon-Mining Journal*—mentions a fine 6-inch center self-acting screw-cutter foot lathe, with patent double treddle and improved anti-friction external crank and chain rolling motion. Also, a new reversing motion to tail pin, for the purpose of cutting screws left or right, without changing wheels or stopping the lathe. The compound sliderest, moreover, is fitted up with an ingenious contrivance for drawing out the tool quickly, which is a very important advantage in screw cutting.

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IN casting a large fly-wheel at the Fort Pitt Works, Pittsburgh, the molten iron was conducted from the furnace across one of the streets of the city, a distance of one hundred and sixty-three feet, to the mold. The diameter of the wheel is twenty-five feet, and its weight forty-two tuns.

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IT is said that when the deaths by cholera in Paris were at near a hundred a day, the total bill of mortality was not increased. The reason for this was that people were frightened and took good care of their health, so that ordinary maladies in the system were not developed.

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## POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening Nov. 16, 1865, the President, S. D. Tillman, Esq., in the chair.

### A PROFITABLE INVENTION.

Mr. Pitkin read a long paper, setting forth the superiority of what is called the factory system of making boots and shoes over the hand system. This system is coming into general use among the shoe manufacturers of New England. The plan formerly practiced was to distribute the work among the farmers' families about the country, who made the shoes mostly by hand, except that portion which could be done by the sewing machine. The invention of a number of machines for fastening on of the soles and heels has led to the adoption of the factory system, by which the hands are brought together in one large building, in which the whole manufacture is conducted. One of the most valuable of these inventions is a machine for sewing the soles; one jaw enters the shoe and the other is on the outside, the thread passing through both insole and outsole, and fastening the two at one operation. The manufacturers pay the inventor the full price for his machine, and then pay him two cents per pair on all shoes sewed by it, for the privilege of using it. One machine will sew 300 pairs of shoes per day; thus yielding a revenue of $1,800 a year to the inventor for each of his machines in use.

As the necessary skill for attending these machines is acquired by very little training, the work is well adapted for boys, and large numbers of convict children are now employed in the manufacture; the profits are very heavy.

### AN INFUSIBLE CRUCIBLE.

Prof. Joy, of Columbia College, exhibited the jet of a compound blow-pipe, as arranged by M. Deville, of Paris, for melting platinum and other refractory substances; a hollow cylinder of copper or platinum, about half an inch in diameter, embraces the jet, and extends about half an inch beyond. M. Deville found that fire clay was melted by the heat of the flame, and he has been trying numerous substances in the attempt to discover one that would make an infusible crucible. The best substance yet tried is quicklime, entirely free from silica and other impurities. The lime is formed into a solid cylinder, by a hydraulic press; the cylinder is sawed in two transversely; the lower part is scooped out to hold the substance to be melted, with a small channel for pouring out the molten mass, and a hole is made in the center of the cover to admit the blow pipe.

### A COPPER ALLOY HARDER THAN STEEL.

Prof. Joy also exhibited some pure silicium, and said that he had seen an alloy of this metal and copper, that was harder than steel.

### PHARAOH'S SERPENTS.

Finally, Prof. Joy closed his interesting experiments by the wonderful exhibition of the new Parisian toy, called Pharaoh's serpents. In 1821 Prof. Woehler, then a young man at Heidelberg University, discovered that a mass of sulpho-cyanide of mercury, if set on fire, would swell up enormously, enlarging its volume many fold. When Prof. Joy was attending lectures at Heidelberg, he saw the experiment, and has since been in the practice of exhibiting it to his class at Columbia College. Recently, a very ingenious Frenchman has adopted the plan of putting little cones of the substance into boxes, and selling them for a franc apiece. Prof. Joy bought one of these in Paris, and there was a constant stream of people buying them at the same place. The cone, about an inch in hight, was placed on a plate and lighted at the top by a match, when it began to burn slowly with a pale flame, and to swell, presenting the appearance of a serpent crawling from out the plate and writhing in painful contortions; this continued for perhaps a minute, when the crooked serpent had reached a length of about a foot, with a diameter of half an inch. In the process, nitrogen is driven off, with a very little sulphide of carbon, and the mass remaining is sulphide of mercury.

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ACCORDING to persons of much experience, Brahma fowls are the best for all purposes. They will lay in cold weather when no others will; are fine to eat, and profitable in all respects.

## NOTES ON NEW DISCOVERIES AND NEW APPLICATIONS OF SCIENCE.

### MAGNESIUM FOR VOLTAIC BATTERIES.

M. Bultinck, of Ostend, has communicated to the Academy of Sciences a note on the use of magnesium instead of zinc as the positive element of voltaic batteries. In order to compare the electromotive force of magnesium with that of zinc, he employed two pairs of wires, one pair consisting of a wire of copper and one of zinc, and the other pair of a wire of silver and one of magnesium. On plunging the first-mentioned pair of wires into distilled water, having first connected them with a multiplying galvanometer, the needle of the galvanometer, at the moment of the immersion of the wires, moved 30°, and after the immersion had lasted five minutes still marked 10°. On similarly treating the silver and magnesium pair of wires, which were of exactly the same dimensions as the copper and zinc pair, at the moment of immersion the needle of the galvanometer deviated 90°, and five minutes after immersion it remained stationary at 28°. Having thus found the electromotive force of a magnesium couple to be three times that of a copper and zinc couple, M. Bultinck became desirous to construct a large battery with magnesium as the positive element, but not being able, for the moment, to obtain magnesium in any other form than that of thin wire, he had to be content with making a "galvanic chain," of the kind associated with the name of M. Pulvermacher. Having constructed such a chain of silver and magnesium, he found that when simply moistened with pure water it would produce all the effects the production of which by an ordinary Pulvermacher's chain requires that the chain be moistened with either a saline or an acid solution. We knew previously that magnesium possesses greater electromotive force than any other known metal capable of being obtained in quantity; the new fact brought to light by M. Bultinck is that a battery in which magnesium was the positive element would not need an acid to excite it, but could be excited by water only.

### CURIOUS FACTS IN DISTILLATION.

In the course of some researches with respect to the phenomena presented during the evaporation of mixed liquids, Berthelot has lately observed some very remarkable facts, of a kind scarcely to have been anticipated. He has found, for example, that if a mixture of two liquids of different degrees of volatility, containing a preponderating proportion of the less volatile liquid, be exposed to the action of heat, it will by no means always happen that the more volatile of the mixed liquids will fly off first. Thus, if one part of alcohol be added to eleven parts of water, and the mixture be heated, the alcohol will not evaporate any more rapidly than the water, although it is much the more volatile liquid of the two. Stop the evaporation at any stage, and the residue will always contain exactly the same percentage of alcohol that was contained in the mixture before the evaporation commenced. In some cases it even happens that the less volatile constituent of a mixture of two liquids flies off first. If, for instance, a small quantity of alcohol be added to a much larger quantity of that exceedingly volatile compound, bisulphide of carbon, and the mixture submitted to distillation, in the vapors which first pass over there will be a far larger proportion of alcohol than in the mixed liquids as originally placed in the retort, and after a little while there will be left in the retort bisulphide of carbon only, the whole of the alcohol having distilled away, notwithstanding that alcohol by itself is less volatile than bisulphide of carbon, in even greater proportion than that in which water is less volatile than alcohol. Similarly, Mr. Carey Lea has found that when a mixture of ethylamine, diethylamine, and triethylamine is distilled, the last mentioned body, although, when by itself, by far the least volatile body of the three, passes over much more rapidly than either of the others. These facts are very curious, and may prove to have practical bearings of much importance, but in the present state of knowledge they are quite inexplicable.

### MECHANICAL POWER FROM THE INTERNAL HEAT OF THE EARTH.

At the last meeting of the Literary and Philosophical Society of Manchester, Mr. George Greaves read a paper embodying the suggestion that the "internal heat of the earth," which he supposes will render it impossible for us to raise coal from below a depth of four thousand feet, should itself be employed in place of the fuel of which he thinks it will one day cut off our supply. He considers that the heat of the fiery ocean which he believes lies under our feet might supply us with all the mechanical power we want, and that one method of causing it to do this "might be by the direct production of steam power by bringing a supply of water from the surface in contact with sufficiently heated strata, by means of artesian borings or otherwise." He has yet to explain, however, how, supposing his "sufficiently heated strata" to really exist, we could make "artesian borings" deep enough to reach them, or how, even if we could make the borings, we could utilize at the surface the force of steam generated at such a depth below it as that at which even Mr. Greaves must suppose the "sufficiently heated strata" to lie buried.

### ARTIFICIAL IVORY.

Both on the continent and in this country the manufactory of "artificial ivory" is conducted on a scale of some magnitude. The process by which the most successful imitation of natural ivory is obtained appears to consist in dissolving either india-rubber or gutta-percha in chloroform, passing chlorine through the solution until it has acquired a light yellow tint, next washing well with alcohol, and adding in a fine powder, either sulphate of baryta, sulphate of lime, sulphate of lead, alumina, or chalk, in quantity proportioned to the desired density and tint, kneading well, and finally subjecting to heavy pressure. A very tough product, capable of taking a very high polish, is obtainable in this way.—*Mechanics' Magazine.*

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## THE STEAMER "SAXON" AND HER SUBMARINE APPARATUS.

We have just returned from a visit to the steamer *Saxon*, now lying at the foot of Essex street, in Jersey City, with her powerful air pumps, engines, and submarine apparatus, prepared to engage in her work of raising sunken treasures from the bottom of the sea. This apparatus is protected by patents obtained through the Scientific American Patent Agency; it is so simple and practical in its character, and is to be tried on a scale so large, and under circumstances so favorable, as to give the best promise for success.

The submarine armor heretofore used consists of a complete suit of india-rubber, made in one piece for the body, limbs, and hands, and after this is put on it is secured by a water-tight joint to a metallic helmet, so as to inclose the diver in a water-tight case; glass plates are inserted in the helmet in front of the eyes, and the air for breathing is supplied by an india-rubber hose, reaching above the surface of the water. The improvement in the armor secured by one of these patents is the substitution for the hose of a metallic case containing compressed air and attached to the body of the diver, thus giving him far greater freedom of motion, and allowing him to go into parts of a wreck where he could not go if he was attached to a hose leading to the surface. The air is controlled by a valve, and the diver allows it to flow at will into his lungs, and, on being expired, it makes its exit through a valve in the helmet, passing but once through the lungs.

The other patent is for a peculiar buoy for raising sunken ships. This is simply a bag, made of india-rubber canvas, and covered with a rope netting, to be fastened securely to the wreck, and then inflated with air forced into it, by a hose leading from the surface, a sufficient number of the bags being attached to lift the wreck. These bags are made fifteen feet in length, and the netting is made of Italian hemp rope one-fourth of an inch in diameter. Each bag will lift 15 tuns.

A company, called the New York Submarine Co., has been formed for working under these patents, with a capital of $300,000. They have procured a steamer of 450 tons burden, have fitted her out with air pumps and an abundant supply of the apparatus, and have placed her under the command of Captain Samuel H. Holbrook, a man who has devoted his life to raising sunken vessels, having a particular fancy for that work. Capt. Holbrook says that it is impossible to raise vessels from a greater depth than 100 or 120 feet; below that the pressure of the water

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causes such a flow of blood to the head of the divers that it is intolerable.

## EDITORIAL CORRESPONDENCE.

*The President—Pardon-seekers—Condition of the Patent Office—The New Appointment—The New Commissioner—Changes in the Law, Etc.*

WASHINGTON, Nov. 23, 1865.

This city has experienced a miraculous change since my last visit. The shoulder-strap gentry, soldiers, flying artillery, the long trains of army wagons, mules, contrabands, and other adjuncts of sanguinary war, have mainly disappeared, and "the city of hacks and magnificent distances" is now restored to the custody of its citizens and office-holders, attended by the usual crowd of hungry office-seekers, and bidders for contracts. Great activity prevails throughout all the departments in anticipation of the early assembling of Congress, at which time, and to which body, the various officials will have to render an account of their stewardship. The man most envied, and most to be pitied, is Andrew Johnson, President of these United States. Though possessed of an iron constitution, capable of great endurance, he has not that elastic element in his nature, which afforded so much relief to his lamented predecessor, who, like William, Prince of Orange, bore the sorrows of a nation upon his shoulders with a smile upon his face. On three different occasions I went to the old White House to see the President for a few minutes upon some important business connected with the Patent Office. Each time I found the halls and ante-rooms, adjoining his private office, thronged with anxious men and women, who either wished to look at, or to get an interview with, His Excellency. By the exercise of a little extra patience and perseverance, on my third visit I succeeded in reaching him. At these interviews, as a matter of courtesy, the women have precedence of the men. Standing near to the person of the President I had a good opportunity, in open court, to learn the nature of several interviews which were accorded to the fair sex. The first one who had the honor of an audience, was a very plainly dressed, elderly woman, attended by a charming creature, who acted as spokeswoman. She interceded with the President in soft, mellifluent tones, for the release of a son of her elder companion, who was pining in durance vile in some government fortress. The President seemed to be moved by the appeal, but replied that in the absence of sufficient knowledge of the case he could not extend Executive clemency. "Surely," said the fair advocate, "you will not refuse me this pardon?" to which the President promptly replied, "I had rather grant twenty pardons than to refuse one," at the same time referring the parties to the Attorney-General. Next in order came a nicely dressed miss, with face closely vailed, carrying in her hand a small package of papers. She seemed not to wish any one but the President to understand the nature of her errand, but from some remarks that fell from his lips, I soon learned that she was seeking pardon for a somewhat aged West Pointer, who had, in some unexplained way, aided the rebellion. The President inquired of her who had examined the case? She replied that Gen. Grant had looked at the papers. The President instantly directed one of his clerks to see what the illustrious man of war had said about it, whereupon the paper was produced, which bore the indorsement of Gen. Grant to the effect that "the case was one of a numerous class well understood by the President." His Excellency then inquired of the young advocate what reason *she* had for urging the pardon. She replied that the party was anxious to go into some business, and, moreover, that he was deaf. At once the President assured her, that the lack of pardon did not prevent him from going into business, and to grant one would not restore his hearing, at the same time referring her case to the Attorney-General. There were at least twenty women and one hundred men waiting for audience. The President, though affable to all, seemed firm in his purpose not to extend clemency without a clear knowledge of such facts as would warrant its exercise. It is said to be a favorite scheme with many, who are excluded by the terms of the amnesty proclamation, to employ the services of women to present their cases to the President. These applicants evidently think that mercy

"Becomes the monarch better than his crown."

The situation is certainly far from being an agreeable one to either party.

The President, though appearing quite well, nevertheless exhibits a care-worn and anxious expression. His labors are excessive, and, from motives of mere curiosity, visitors ought not to force their attentions upon him, and just now especially, while he has so many burdens to bear; besides, the White House is a dirty old place, and is not fit for his residence.

I made a somewhat careful examination into the

CONDITION OF THE PATENT OFFICE.

It is the noblest building, architecturally speaking, in Washington. It was originally founded exclusively for a Patent Office, but, upon the creation of the Department of the Interior, its offices were located in the Patent Office building, and the affairs of the office were subordinated to the Interior Department.

The SCIENTIFIC AMERICAN earnestly protested against this arrangement, and the wisdom of this protest is now made as clear as a sunbeam, to all who have taken note of the wonderful progress which has marked the history of invention during the past ten years.

The Patent Office is now finished according to the original plans. Over $400,000 of the patent fund have been absorbed in its construction, while the office itself has paid all its legitimate expenses out of its receipts. If the business of the office continues for ten years at the same ratio of increase as in the past five years, every available foot of this immense structure will be required for its purposes; and it is to be hoped, in view of this patent fact, that before the close of the next Congress a bill will be passed to establish the Patent Office on an independent basis, and that a proper building for the Interior Department will be authorized. Fifty thousand patents have already been granted, to say nothing of the large number of rejected cases. Models are now rapidly accumulating, and, much sooner than many suppose, the cases now fitted for their reception will be filled. Either the exaction of models must be soon dispensed with or more room will have to be appropriated for their proper care.

Considerable surprise has been expressed that the President should have so long neglected to appoint a suitable person to fill the vacancy in the Board of Appeals, considering the great accumulation of cases before that Board.

Mr. Theaker, formerly a member of the Board, is now Commissioner of Patents. Mr. Coombs resigned some months ago, and has resumed the practice of law in Washington, Mr. Hodges of the old Board alone remained. Judge Foote, a most excellent and competent man, has just entered upon the duties of the Board, and will do good service. Four chief examiners in the Patent Office—Dr. Page, Mr. Blanchard, Mr. Peale, and Dr. Doane—were applicants for this position, and were each strongly recommended by their friends, but I understand that the President has at last found the right man for the right place, in the person of Mr. Fessenden of Maine, brother of Senator Fessenden, to fill the vacancy.

Respecting the new incumbent, I have been unable to learn anything definite as to his qualifications. He belongs to a family distinguished for ability and practical good sense. The Board has plenty of legal ability, and it is to be hoped that Mr. Fessenden will bring to its aid the mind of a well-instructed and experienced mechanic.

THE NEW COMMISSIONER.

Commissioner Theaker possesses a full and thorough knowledge of his duties. He well deserves the confidence and cheerful support of the whole clerical force of the office. No man who has ever filled that important chair brings to its duties a higher purpose to discharge its trust more faithfully and earnestly; and now that the vacancy in the Board of Appeals is filled, I trust that he will reclassify the whole business of the office, so that the labors may be more equitably distributed.

Some of the examiners are overworked, for want of proper assistants, while others have not enough to do; hence, while in some classes the work is well up, in others there is an unusual accumulation of cases. If there are any drones in the hive they ought to be expelled, and it would be an act of well-merited justice to promote some of the assistant examiners who have so long and faithfully discharged the duties of principals.

I trust that the Commissioner will resolutely use his influence to promote these much needed reforms and changes. The duties of chief clerk are now ably performed by Thomas Harland, Esq., of Norwich, Conn.

I understand that Mr. Jenckes, who was Chairman of the House Committee on Patents during the last Congress, and who is quite likely to occupy the same position in the next Congress, is now engaged in preparing a bill designed to establish the Patent Office as an independent bureau, and also to secure some other changes in the law of patents.

I do not know what Mr. Jenckes contemplates in the way of changes in the law, but trust he will act in such matters in consultation with the Commissioner. This would insure inventors against radical changes in the present admirable system of granting patents.

The business of the office was never so large as now. During the month of October 628 patents were issued, and upward of 500 will probably issue during the month of November. I think the records will show that fully one-third of the whole were clients of the Scientific American Patent Agency—the balance being divided between hundreds of local agencies in the various cities of the Union. ***

## New Chain Machine.

A novel and ingenious invention has been brought out in England by which the production of chains is greatly facilitated, at the same time that the strength of the article is increased, and the price reduced. The process may be described as follows:—The end of the bar of iron, as it comes hot from the rolls, is placed in the machine, which coils it upon a mandrel, having the shape of the inside of the link required. A sliding rest, moved by a screw, distributes the bar of iron upon the mandrel, forming what is technically called a helical coil, having a 3-inch pitch. By a simple arrangement the coil is then pushed off the mandrel onto the bar connected with the shears, where a peculiar form of steeling allows the coil to be cut obliquely, so as to form a scarfed joint, and the link, when cut, to fall off, or to be moved. The link is then taken to the welding press, where it is closed, welded, finished, and the stud put in by pressure in metal dies. The violent exertion of welding with heavy sledge hammers, producing an intermittent and uncertain concussion so injurious to the fiber of the iron, is done away with, and an instantaneous pressure over the whole surface of the joint is substituted. The superiority of this system of manufacture seems to be palpable; the saving effected in labor is from 50 to 75 per cent. The inventor is Mr. George Homfray, of Hales Owen.—*The Ironmonger.*

## Important to Southern Inventors.

Secretary Harlan has issued the following instructions to the Hon. Thomas C. Theaker, Commissioner of Patents:—

"The subject of granting patents to the citizens of States recently in rebellion has been submitted to the President, and I am instructed by him to direct that no patent be granted to any resident of a district declared by the President to be in a state of rebellion without satisfactory proof of loyalty is furnished, embracing the original or an authenticated copy of the amnesty oath as taken by said resident; and if parties making application for patents belong to the excluded class, evidence of their special pardons by the President should be furnished.

JAS. HARLAN, Sec'y of Interior Department."

AN extensive coal field has just been discovered at the foot of Mount Olympus. The coal is said to be well adapted to steam purposes, and is so abundant that it can be sold for $2 per tun. It is intended to establish a depot of the coal at Suez for the supply of the steamers.

BY the spectrum analysis Bunsen was able to detect the 70,000,000th part of a grain of lithium in a compound; while of sodium the 180,000,000th part of a grain could be made perceptible.

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## Notes and Queries

R. M., of N. Y.—Your idea that the Indian Summer is caused by the latent heat given off in the freezing of the great lakes we do not believe is sound. The temperature of the air must be below the freezing point in order to absorb the heat and freeze the water.

C. P. R., of Mass.—A new stove burns better than an old one, because it is clean. There are many places where the soot collects, which retards the draft, for air passes more easily over smooth than rough surfaces.

J. W., of Conn.—Substances loosely compressed are not so good conductors of heat as the same material tightly packed, for the reason that the continuity is diminished, and the air imprisoned in the interstices.

T. M. F., of Minn.—It is a well-known law that liquids transmit force equally in all directions, and with the same intensity.

W. W. S., of Conn.—It is perfectly practicable to heat water to very near the boiling point by the exhaust steam, but the heater must be properly made, otherwise it will cause back pressure, or, in other words, choke the exhaust. Steam from a steam hammer could be used as well as any other.

B. L., of N. J.—We do not know which is the best place for wages in this country. We are told that in California wages are about the same that they are in New York. In Oberstein, Rhenish Bavaria, they hire workmen for $1 50 per week. Avoid Oberstein.

W. B., of Ind.—You must decide for yourself whether it will pay or not to take out a patent. Yes; a thing that will run by wind, and make its own wind at the same time, is a veritable perpetual motion.

M. C., of Me., asks:—"Has the purchaser of part interest in a patent the right to manufacture and sell without the consent of the other owners, and appropriate the profits wholly to his own use?" Answer—Yes.

W. H. S., of N. J.—The address of the inventor of the plan for seasoning lumber about which you inquire, is H. G. Bulkley, Cleveland, Ohio.

G. T., of N. Y.—A rifle ball fired vertically upward would fall with the same velocity that it rose, in a vacuum but it will not in the air. The resistance of the atmosphere prevents the ball from rising so high as it would in a vacuum then further checks its velocity during its descent.

J. W. F., of Mo.—The inventive ingenuity of the country has been directed for many years to plans for warming air for dwellings, and we should suppose that some of these would be suited to your purpose. Bones are softened for agricultural purposes and made more soluble by immersing them in dilute sulphuric acid; but if the acid has been neutralized by lime, forming sulphate of lime, it will not act on the bone.

An Old Subscriber, of N. Y.—The reason why the St. John boiler explosion was less disastrous than is usual with Western boiler explosions, is, that the St. John was run with low pressure steam, while the Western steamboats are generally run with steam of very high pressure. The notion that some great mystery is involved in boiler explosions is incorrect; they always result from imperfect workmanship or, careless management. In the case of the St. John, the sheet that gave way had been cut partly through, right along the line of fracture, by the chisel used in chipping off the overlapping sheet.

J. C., of N. Y.—To make toilet soap of common soap, mix with it vanilla or any other perfume that you prefer.

G. R. S., of N. Y.—The harder steel is, the more brittle it is, and as the temper is drawn it grows tougher. When very cold it is more brittle than when warm.

A. S., of Mass.—Round valves and hollow valve rods are not new.

J. A. S., of N. J.—Probably you can obtain a patent.

S. Z. A., of Pa.—"The Clock and Watchmaker's Manual" can be had of John Wiley, bookseller, New York.

A. J., of Wis.—The grant of a patent does not relieve a patentee from the payment of the local license fees or taxes in any city, county or State. Patentees must comply with local laws, the same as other citizens.

P. T., of Pa.—Run your circular saw 1,500 revolutions per minute. Your pulley should be 18 inches in diameter to get 800 revolutions.

C. H. M., of Ill.—For discussion of your questions we must refer you to Nystrom's work on screw propulsion—though no definite answers can be given to most of them.

W. M., of Mass.—Any person can obtain a patent in this country without declaring intention of citizenship. Natives of Nova Scotia must pay $500 fee for patent. New Brunswickers the same as American citizens.

W. W., of N. H.—Scrap tin crowded into rat holes is said to be effectual in driving them away.

### TO OUR ADVERTISING PATRONS.

Advertisers are referred to the new list of rates at the head of the advertising page. Those who have paid in advance for a certain number of insertions will have their advertisements continued at the old rates till the time paid for is up. All new advertisements will be charged 40 cents a line each insertion.

Advertisers will accommodate us, and save expense to themselves, by making their advertisements as short as possible.

## Correspondence

### Index for Change Wheels in Screw Cutting.

Messrs. Editors:—Believing that the following method of forming a table of change wheels for screw cutting lathes is entirely new, and that it will be interesting and useful to a large class of your numerous readers, I offer it for publication:—

| —5— | | —6— | | —7— | | —8— | | —9— | |
|---|---|---|---|---|---|---|---|---|---|
| 20 | 25 | 20 | 30 | 20 | 35 | 20 | 40 | 20 | 45 |
| 24 | 30 | 22 | 33 | 24 | 42 | 21 | 42 | 24 | 54 |
| 28 | 35 | 24 | 36 | 28 | 49 | 22 | 44 | 28 | 63 |
| 32 | 40 | 26 | 39 | 32 | 56 | 23 | 46 | 32 | 72 |
| 36 | 45 | 28 | 42 | 36 | 63 | 24 | 48 | 36 | 81 |
| 40 | 50 | 30 | 45 | 40 | 70 | 25 | 50 | 40 | 90 |
| 44 | 55 | 32 | 48 | 44 | 77 | 26 | 52 | 44 | 99 |
| 48 | 60 | 34 | 51 | 48 | 84 | 27 | 54 | 48 | 108 |

The numbers 5, 6, 7, etc., at the head of the table, represent the number of threads to the inch it is desired to cut. The two columns of numbers under the number 5 represent the different sets of wheels—each wheel being designated by its number of teeth—which may be used to cut five threads to the inch, four being the number of threads to the inch on the leading screw; the left-hand column representing the wheels on the stud, and the right-hand column the wheels on the leading screw. Thus, 20 and 25 form the first set, 24 and 30 the second set, and so on. The two columns under the number 6 represent the different sets of wheels which may be used to cut six threads to the inch, and so with the columns under the numbers 7, 8, etc.

Considering the first sets of the different columns, it will be seen that, while the wheel on the stud remains unchanged, the numbers representing the different wheels on the leading screw will form an arithmetical progression, whose common difference is equal to the quotient obtained by dividing the number of teeth on the stud wheel by the number of threads to the inch on the leading screw. This method of finding the common difference is a general one for any progression which may be formed of the numbers at the top of the right-hand columns. All the columns are also in arithmetical progression. The common differences of the first two columns are respectively 4 and 5; of the second two, 2 and 3; of the third two, 4 and 7; and of the fourth two, 1 and 4.

It will be seen that these common differences are the least two whole numbers having the same ratio as the number of threads to the inch on the leading screw and the number of threads to the inch it is desired to cut. Having found the first set—namely, 20 and 25—by one of the various rules which have been published in the Scientific American, we can then form the table almost as rapidly as we can write the numbers down, and to any desirable extent.

The table may be extended to the left so as to include the numbers 1, 2, and 3, if it is desired

Joseph Spor.

Philadelphia, Pa., Nov. 14, 1865.

### The Philosophy of a Top.

Messrs. Editors:—Can you tell us why a boy's top will assume and maintain an erect position while spinning? A. S. C.

Suspension Bridge, Nov. 4, 1865.

[The same explanation that we gave, some time since, of the gyroscope, applies to a top. If you tie a stone to the end of a string and swing it about your finger, then while it is whirling, if a sheet of thin paper be held so that the stone will strike it at a sharp angle in a way to turn the stone from the plane of its revolution, the stone will resist this effort to turn it from its course, and will pass through the paper. If a sufficient number of stones are united to form a complete wheel, and the wheel is put in rotation, each one of the stones will resist any effort to change the plane of its revolution, and thus the whole wheel will resist any effort to change the plane of its rotation. When a top is rotating in an upright position, it cannot lean toward any side without changing the plane of rotation of all its parts; consequently, so long as it is rapidly rotating it stands upright.

When the axis of the top is inclined, the force of gravitation tends to draw it downward, and thus to change the planes of rotation of all its parts. If you will take a wheel and incline its axis, you will see that the struggle to resist this change will move the wheel forward, and will thus give to it a revolution around an imaginary vertical axis. Even in this revolution the planes of rotation are constantly changed, but the change is the less the more nearly the axis of the top coincides with the imaginary vertical axis about which it is revolving; hence it is subjected to a constant tendency to assume an upright position, and the more rapidly its rotation, the stronger is this tendency.

The resistance offered by a rotating wheel or disk to any change in the plane of its rotation is worthy of consideration in many applications of mechanism. This resistance tends to make a fly wheel run true, and, consequently, to so wear its bearings as to correct any slight error in its original hanging. It increases the resistance of locomotive and car wheels to the change in the direction of their motion in passing round a curve. It precludes the employment of Avery's engine for driving locomotives, and suggests that, if his engine should be used for this purpose, it should run on a vertical, instead of horizontal, axis.—Eds.

### A Question of Boiler Feed.

Messrs. Editors:—Having been a constant reader of your paper for a number of years allow me to ask you a few questions. We have an upright boiler for hot water, and connected to the boiler is about 1,500 feet of pipe, for the purpose of heating a building. The boiler is in the cellar, and is fed through a three-quarter pipe from a tank forty-five feet in hight, the water in the tank four feet deep, the pipe at the bottom of the tank, and about twenty pounds pressure of water. Attached to the boiler is a thermometer to tell the temperature of the water. Now the question is, can the water be heated more than 212° without backing up into the tank. Some think it is the same as an open boiler, boiling in the open air, and the water cannot be heated more than 212°; that if the thermometer indicates more than 212° it is not correct. I am of a different opinion. I think the water can be heated more than 212°—enough more to overcome the pressure from the tank; how much more I cannot say. It is a fact that the water has been 230° without heating the water in the tank. But I have not tried to see how much higher temperature I can get it without heating the water in the tank. Please let us know your opinion about it.

G. S. Kingsbury.

Somerville, Mass., Nov. 4, 1865.

[It is plain that the pressure of steam must be greater than the weight of water in the pipe in order to force this water back into the tank. As the water is heated in the lower end of the pipe, it will expand, and will be forced upward by the colder water of greater density sinking down and displacing it; this circulation will convey heat from the boiler to the tank, and will tend to equalize the temperature of the two. The rapidity of the circulation, and, consequently, the rapidity with which the heat will be transferred, will depend mainly on the size of the pipe. The circulation will be obstructed by bending the lower end of the pipe upward, in the form of a U.—Eds.

### Iron Making.

Messrs. Editors:—I have before me your description of the Bessemer steel, and I have no doubt it must strike your readers that it reveals such radical defects in our present iron making as should awaken the inventive genius of chemistry. First, we waste coal and spoil the iron by supercarbonation. Next, we consume more coal to drive out the carbon to make the iron ductile. Finally, we bake it again in carbon, to restore some of the carbon it had at first and which we spent so much to drive out of it: and this makes it steel. From this it is to be inferred that a certain diminished portion of carbon imparted in the furnace would probably give us cast steel, and from this we could make wrought iron, with again less expense of carbon and labor. Malleable cast iron professes to be made by extracting carbon from pig-metal superficially, and, as steel men aver, so do malleable cast-iron men, that some nitrogen is necessary. Malleable cast iron has very extended uses, which would be trebled if it could be obtained of uniform quality. It is very unreliable in this respect; and the same is said of Bessemer steel. The fact that

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51,034.—Dog Bolt.—Albion P. Floyd, Niagara Falls, N. Y.:

I claim the vibrating bolt, A, with the plates, D and A', shaft, E, and crank, E', when constructed, applied, and operated as described and for the purposes specified.

51,035.—Refrigerator.—Alex. Forbes and John Macbeth, Cleveland, Ohio:

First We claim the ice chamber, D, constructed and arranged with curved double slats, in combination with the trough, as and for the purpose set forth.

Second, We claim the tapering ice chamber, D, in combination with the refrigerator, when constructed and arranged in the manner and for the purpose set forth.

51,036.—Apparatus for Curing India-rubber.—James B. Forsyth, Roxbury, Mass.:

First, I claim the employment or use, for curing goods of india-rubber or allied gums, of an apparatus composed essentially of two plates, which can be compressed by screw rods, or other suitable means, and which are partially or wholly inclosed in a suitable jacket, to be heated by steam or other suitable heating medium, substantially as herein set forth.

Second, The raising, lowering, or opening of said jacket, by means of screw rods, or other suitable means, constructed and operating substantially as and for the purpose described.

Third, The packing strips, S, in combination with the plates, A* D*, and jacket, B* C*, constructed and operating substantially as and for the purpose set forth.

51,037.—Governor Valve.—Robert W. Gardner and John Robertson, Quincy, Ill.:

I claim a hollow valve provided with three collars, C D E, arranged and operating in a case or chamber, A, with four seats, a b a' b', substantially as and for the purpose described.

[This invention relates to a balanced governor valve, to be used with or without a system, for stopping the engine in case of accident, by automatic stop motion or otherwise. Said valve is hollow, and provided with two faces, and it is fitted in a case with two sets of seats, one above and one below, steam being admitted by a suitable pipe. This steam passage is between the two faces of the valve, and when said valve is partially raised, a portion of the steam passes down on the outside, and another portion through the inside of the valve, and the valve is balanced under all circumstances; but when the valve is raised clear up, it cuts off the steam the same as when it is stopped.]

51,038.—Spooling Machine for Tape Looms.—J. Gibbs, Warren, Mass.:

First, I claim the combination with the frame, A, of the supporting brackets, B B, projections or arms, C D and G H, as and for the purpose stated.

Second, The combination with the shipper, R, of the spring, K, groove, e, shipper pad, T, and shipper rod, S, substantially as set forth.

Third, The combination of the cam, P, gear, F, screw shaft, E, with guide rod, O, and guide, N, constructed and arranged substantially as and for the purposes set forth.

51,039.—Machine for Printing Calico.—John Green, Lowell, Mass.:

I claim the printing of a square, or rectangular, or other endless border with one cylinder, and printing figures within the space inclosed by such border by one or more cylinders having a diameter or diameters less than that of the border-printing cylinder.

I also claim the printing of a right line border or one with two ends with one cylinder, and printing the filling between such border by means of one or more cylinders having a diameter or diameters less than that of the border-printing cylinder.

I also claim, in combination with the printing cylinder, D, the bed cylinder, A, and the blanket, E, the border-printing cylinder, C, having a diameter larger than that of the printing cylinder, D, and prepared so as to print a border as specified.

I also claim the combination as well as the arrangement of the equalizing speed roller, B, the blanket, E, the bed cylinder, A, the printing cylinder, D, and the border cylinder, C, the two pulleys, l m, and the belt, i, or the equivalents thereto.

I also claim the arrangement of the inking belt, d, and its operative mechanism, the border-printing cylinder C, the bed cylinder, A, the printing cylinder, D, and the blanket, E.

51,040.—Circular Loom.—John J. Greenough, New York City:

I claim the employment of two or more shuttles, constructed as herein-described, in a circular race, the fore of which is formed as described, and following each other continuously in one direction, and weaving, substantially as and for the purposes set forth.

I also claim, in combination with the ring, W, the flaring or expanding of the warp, substantially as and for the purposes set forth.

I also claim the employment of the ring, W, and the disk, W', at the line where the cloth is formed, substantially as and for the purposes herein set forth.

I also claim beating up the filling by means of the shuttle, when combined with a circular race and ring, W, substantially as herein set forth.

51,041.—Rein Guard for Vehicles.—C. B. Guy, Elkader, Iowa:

I claim a rein guard for vehicles, constructed and applied to the draught pole, to operate in the manner substantially as and for the purpose herein set forth.

[This invention relates to a new and simple device for preventing the lines or reins from dropping under the front end of the draught pole, a contingency of not unfrequent occurrence, and which is always attended with considerable annoyance and embarrassment, and sometimes with danger, especially if the team be restive or inclined to be unmanageable.]

51,042.—Oil Still.—Charles A. Hardy, Pittsburgh, Pa.:

I claim constructing a still, for the distillation of oil and other liquids, with an outer chamber, enveloping it on top and at the sides, so as to leave a space above and around or partly around the inner or main still, thus forming an outer and inner chamber communicating with each other by one or more siphons or valves for the purpose of heating the oil or other liquid and vaporizing its lighter constituents before its admission into the main or inner still, and thus effecting an economy of heat.

Second, Surrounding the main still, laterally with a space, through which the fluid to be distilled passes before entering the main still, for the porpose of preserving a more uniform temperature in the still, and preventing the escape of heat, and also to prevent the necessity of encasing the still with any solid non-conductor of heat, so that when the still is emptied it may be more readily cooled,

Third, The use of a coke receptacle, or pit, extending from a point at or near the circumference of the still, towards and near to its center, situate under the bottom of the still, and communicating therewith, for the purpose of receiving the residuum deposited therein by means of the scraper.

Fourth, The use of a removable drawer for the coke or residuum, placed under an opening in the bottom of the still, in combination with the valve for closing the opening in the still, when the drawer is to be removed, substantially as and for the purpose hereinbefore described.

Fifth, The use of a tapering slide valve in the bottom of the still, operated by suitable means, for the purpose of closing tightly the opening in the still bottom, substantially as hereinbefore described.

Sixth, The use of a hollow valve-case so constructed and arranged, substantially as hereinbefore described, as to receive the sliding-valve, which opens and closes the hole in the still bottom, when the valve is to be withdrawn, without allowing the escape of oil.

Seventh, The use of a scraper, consisting of a number of fingers or shovels, pivoted, hinged, or otherwise so attached to revolving arm or arms, as to press upon the bottom of the still, and rise over any obstruction, for the purpose of cleaning the residuum from the bottom of the still, constructed and operating substantially as hereinbefore described.

51,043.—Baling Press.—George W. Hart, Aurora, Ind.:

I claim, First, the mode of holding a self-operating feed door, shut by the arms. O O', and rods, P P', at or near a dead center in the described combination with the self-starting and counterbalancing arm, Q.

Second, The plurality of sweeps, J and K, of unequal width for operating a self-feeding door, H, to bale mixed forage, substantially as set forth.

Third, The hollow packer, provided on its under surface with projections or inequalities, W, as specified.

Fourth, the reversible parts, M N n O O' P P' Q q q' R R and S, in combination with the shifting sheave block, m, for operating either feed door, H, as set forth.

51,044.—Clock Escapement.—Horatio T. Hewitt, Scotch Plains, N. J.:

I claim the combination and arrangement of the single-pin escape wheel, the slotted lever and the balance, substantially as and for the purpose herein specified.

51,045.—Cord Tightener for Window Curtains.—Michael Hey, Philadelphia, Pa.:

I claim the employment of the screw, A, block C, and button, D, in combination with a suitable frame or case, B, the same being constructed and arranged to operate together, when applied as and for the purpose described

51,046.—Steam Boiler.—Holmes Hinkley, Boston, Mass.:

I claim the arrangement of the three series, k l m, of smoke tubes, and the two auxiliary smoke boxes or chambers, e f, with the main smoke box, g, the furnace, and water space, O, of the boiler.

51,047.—Darning Last.—Delia C. Holden, Cleveland, Ohio:

I claim the construction of a darning last, when made of a flattened oval form, and with hard and smooth surfaces, for the purpose and in the manner substantially as described, as a new article of manufacture.

51,048.—Die Stock.—William and James Holroyd, Waterford, N. Y.;

We claim, as an article of manufacture, a screw-cutting die stock, having two handles, and provided with a socket or sockets for the shank or shanks of a screw tap or taps, substantially as herein described.

51,049.—Weather Strip and Stop.—J. G. C. Horton, Litchfield, Ill.;

I claim the stop, B, and the shank, D, with the spring, d, and face plate, E, in combination with the door, A, for the purpose of forming a combined weather stop and door bolt.

51,050.—Brick Machine.—James Hotchkiss and Ezra Buss, Springfield, Ohio:

We claim, after lowering the followers, while the molds are passing under the pug-mill, so as to receive a surplus of clay in the molds, and the raising of the followers, so as to expel the surplus clay while still under the pug-mill, substantially as and for the purpose herein specified.

We also claim the adjustable yielding and removable striking and pressure plate, R, arranged and operating substantially in the manner herein set forth.

We also claim the spring scraper, r, as described and for the purposes herein set forth.

We also claim the set screws, n n, or their equivalent, in the sides of the followers or molds, substantially as and for the purposes herein specified.

51,051.—Reservoir Drill for Tube Wells.—Charles Houghton and Robert S. Lewis, Attica, N. Y.:

We claim a conical reservoir drill with perforations, or their equivalents, for admitting the water to said reservoir, provided with a flange that fits around the pipe at its connection therewith, for the purposes and substantially as herein described.

51,052.—Manufacture of Flexible Tubing.—David H. Hoxie and Thomas L. Reed, Providence, R. I.:

We claim, First, Preserving animal intestines and like animal tissues in their natural moist condition by means of a compound of glycerin and glue or other material or compound that will remain unaffected by extremes of temperature as described.

Second, The use of a compound of glycerin and glue in the requisite proportions, in combination with a covering of fibrous material, as and for the purpose described.

Third. The tubing constructed wholly or in part of the materials combined in the manner for the several purposes herein set forth and described.

Fourth, We claim the enamel varnish compound, substantially as described.

51,053.—Machine for Canceling Postage and Revenue Stamps.—Thomas S. Hudson, East Cambridge, Mass.:

I claim the arrangement of the spring latch, viz: within and so as to project from the plunger and operate directly with the chain wheel, in manner as specified.

51,054.—Spinning Machine.—Margaret Hulings, Indianapolis, Ind.:

I claim the combination and arrangement of the box, 6, with the apartments, 7 and 8, placed upon the carriage, K, the tightener, 1, and box, 2, with slots and set screws, 3, and the guard, 5, all operating substantially as and for the purpose described.

51,055.—Cultivator.—Hanford Ingraham, Naples, N. Y.:

I claim the shank, A, with circular or curved plate, a, having a series of notches or cuts, a', and slot, c, whereby the same may be adjusted either laterally, angularly or otherwise, by means of stationary pins, d, or movable pin, their equivalent, either with or without a slot in the plate, as may be desired, substantially in the manner and for the purpose herein set forth.

51,056.—Water Meter.—Henry Isham, New Britain, Conn.:

I claim the cluster of cylinders capable of revolving about a common center, provided with pistons, sub-tantially as described, in the combination with the inclined plate, or the equivalent thereof, with which the piston rods are connected, and with the bed plate and its induction and eduction ways, substantially as and for the purpose specified.

And I also claim in combination with the cluster of cylinders and the bed plate, the case surrounding the cluster of cylinders, and the eduction aperture or port to discharge into the case, substantially as and for the purpose described.

51,057.—Clothes Dryer.—Chas. H. Jackson, St. Louis, Mo.:

I claim the combination and arrangement of the post, A, with the annular plate, B, the arms, C and C', and brace, E, and tie frame, D, substantially as and for the purpose set forth.

51,058.—Clamping Pontil.—F. H. James and N. B. Gatchell, Lancaster, Pa. Antedated Nov. 8, 1865.

I claim, First, a bevel conical ring, A, in combination with the disk, F, operating substantially as and for the purposes described.

Second, The pontil tube, or handle, C, in combination with rod, D, spring, h, and disk, F, operating in the manner as and for the purposes herein set forth.

51,059.—Window and Door Fastener.—Horatio Jordan, Norfolk, Conn.:

I claim the combination of the slotted plate, slotted bolt, and detached sliding knob or handle, all constructed and arranged substantially as described.

51,060.—Cement for Steam Joints.—J. G. Kilgour, Brooklyn, N. Y.:

I claim, First, A cement composed of litharge, sugar of lead, whitening and yellow ocher, mixed together in suitable proportion, substantially as and for the purpose set forth.

Second, A cement composed of litharge, sugar of lead, whitening, and yellow ocher, mixed with venetian red, in suitable proportion, as described.

[This invention relates to a cement which is intended particularly for steam joints of any kind, and for the purpose of facilitating the application of patches to defective steam boilers.]

51,061.—Spring Bed Bottom.—Samuel P. Kittle, Brooklyn, N. Y.:

I claim, First, Constructing the slats to which the springs are attached, with bevelled edges, and weaving these slats together with webbing or strips of cloth extending through the series, so as to form close hinges, in the manner hereinafter described, or weaving in the slats bearing the springs and blocks in place of the others in the same manner.

Second, Attaching the bracing springs to the coil-supporting springs, at a point below the first coil and above the center of the said supporting spring, as set forth.

51,062.—Harness.—F. D. Ladenberger, Glenbeulah, Wis.:

I claim, First, The straps, F and J, in combination with the spring, I, hames, C, and neck yoke, B, substantially as described, and for the purpose set forth.

Second, The spring, I, in combination with the wagon tongue, A, and the straps, F and J, substantially as described, and for the purposes set forth.

[This invention is designed to guard horses from being injured by the thrashing about of the wagon tongue, and consists in passing straps from the ends of the neck yoke diagonally to the horse's hames, and thence to a slide ring, working upon the free end of a spring running parallel with the tongue, and a short distance above it, the other end of the spring being attached to the tongue. By this arrangement the neck yoke, hames, and tongue work freely in controlling the wagon, while the elasticity of the spring controls the tongue].

51,063.—Railroad Car Truck.—John P. Laird, Altoona, Pa.:

I claim, First, The main frame, composed of the cast-iron pieces, A A, and plate-iron transverse beams, B B', the whole being constructed substantially as described for the purpose specified,

Second, The combination of the above with the bars, F and H, braces, G G, and the guides, D and D', or their equivalents, for the reception of the axle boxes.

Third, The cast-iron bar, L, having sockets for the reception of the spring bands, f f, in combination with the permanent hangers, M M'.

41,064.—Broiler and Toaster.—Theodore C. Law, Green Island, N. Y.:

I claim as an article of manufacture the broiler or toaster, constructed as described and represented.

51,065.—Drill.—Henry Loftie and Egbert Hinman, Syracuse, N. Y.:

We claim the cutters, a and b, in combination with reamer, d, and cutter, c, arranged in relation to each other, substantially as described.

51,066.—Door Threshold.—Charles Loring, South Braintree, Mass.:

I claim a water stop threshold in which the water groove or channel running around the top surface, near the inner edge of the threshold, has an inclination from each end toward and so as to conduct the water into a conduit leading from the center of the groove, beneath the threshold and to the front side thereof, substantially as set forth

51,067.—Ditching Machine.—Peter Lugenbell and James S. Armstrong, Greensburg, Ind.:

We claim, First, The combination of the excavating share, H, and sides, P P, of the side-discharging chute, L, when said sides are formed in front with cutting edges, and all arranged to operate as and for the purposes herein set forth.

Second, The arrangement of the parts, H M M' N n O P P' Q and S S', or their mechanical equivalents, for expanding and contracting the chute and securing its free discharge or delivery, substantially as set forth.

Third, The arrangement of parts, A B B' b b' C D E F and G, for enabling our excavating and discharging apparatus to cut a ditch of any desired uniform depth.

51,068.—Glass Pot.—Daniel McAffee, Pittsburgh, Pa.:

I claim a glass house pot, with a partition wall dividing the interior into two or more compartments, each communicating with the outside through the neck and with each other through a series of openings at the bottom, and so constructed as that the latch or composition as it melts in one apartment will flow through into the other, from whence it can be taken and worked in the usual manner.

51,069.—Instrument for Measuring Liquids in Casks.—Wm. C. McCarthy, Pittsburgh, Pa. Antedated Nov. 2, 1865:

I claim a transparent gaging tube, with or without a metallic casing, with openings to see through, having a scale of figures engraved or otherwise affixed thereon, and a valve at the bottom, operated by a rod and spring, substantially in the manner and for the purposes herein set forth.

I also claim combining with the transparent tube and valve, a sliding or stationary scale to indicate the ullage, substantially as hereinbefore stated.

51,070.—Rake Attachment to Harvester.—Lewis Miller, Akron, Ohio:

I claim, First, The stationary centrally supported elevated table A, for holding up the heads of the grain while the rake arm passes around underneath the table and between it and the platform, substantially as and for the purpose described.

I also claim, in combination with the elevated table for holding up the heads of the grain, the raised ledge on the platform for holding up the buts thereof, so that the rake will with certainty sweep off the grain that bridges the space between them, substantially as described.

I also claim inclining the table from its rear toward its front, so that the grain may not pass under to interfere with the free working of the rake, while the rake arm and its connections can freely turn underneath the table substantially as described.

I also claim, in combination with the elevated table and platform, the two open spaces between the ends of the table and the sides of the platform, for the revolving rake to pass in to take, and to pass out of to deliver, the cut and gathered grain, substantially as described.

51,071.—Rake Attachment to Harverster.—Lewis Miller, Akron, Ohio:

I claim, First, A clearer for pushing the grain from the rake, when said clearer is operated from guides or switches placed on the platform, substantially as described.

I also claim the combination of a rake and clearer, when so operating as that the latter is made to aid the former in carrying the grain around the point of delivery, and then push it off from the rake, substantially as described.

I also claim the combined action of the movable bent arm on the clearer or rake, and the stationary but arm on the grain table, the two operating to prevent the grain from falling into the open space through which the rake moves, substantially in the manner herein described.

I also claim the use of the stationary stud, i, as a permanent support for the wheel that carries the rake to move around, and as a stationary support for the grain table, and to make an unobstructed space for the rake arm to sweep or turn in, substantially as described.

51,072.—Orrery.—John G. Moore, Philadelphia, Pa.:

I claim, First, The combination of the stationary crown wheel, B, with the sleeve, A, the latter carrying gear wheels which utilize the horizontal motion of the shaft, X, in the rotation of the train of wheels which act upon the planet, and its satellite.

Second, Hinging the table to the standard, in combination with the graduated arc, and set screw, as and for the purpose set forth.

51,073.—Churns.—C. R. Morehouse, Cardington, Ohio:

I claim the dasher with tapering angular throats, K, extending from each side of the shaft when constructed as described, either separately or combined with the breakers, c, and churn, when constructed in the manner therein set forth.

51,074.—Attachment for Brooms.—Jacob H. Mumma, Harrisburg, Pa.:

I claim the plates A A', with the hooks, e e, or their equivalents constructed and adapted for attachment to the cord, x, or equivalent device for securing together the stalks of the broom, all substantially as and for the purpose specified.

51,075.—Apparatus for Refining Lard.—George C. Napheys, Philadelphia, Pa.:

I claim, First, Combining and arranging the agitator or stirrer, B, with the cooler, A, substantially in the manner hereinbefore described and for the purpose specified.

Second, Combining the lugs, b, with the cooler, A, substantially in the manner and for the purpose above set forth.

51,076.—Steam-hoisting Apparatus.—Chas. R. Otis, and Norton P. Otis, Yonkers, N. Y.:

We claim so applying the lever of the brake of a steam-hoisting apparatus, steam cylinder, and piston and suitable valves, and con

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necting the same with the lever of the stop valve of said steam-hoisting apparatus. that by operating the latter lever to let on or shut off steam, a reverse movement is effected in the valves of the cylinder attached to the brake, substantially as herein described.

### 51,077.—Loose Pulley.—Norton P. Otis, Yonkers, N. Y.:

I claim the supply chambers, C C, containing wick or other capillary material, and the openings or passages, c c, and c'' c'', in combination with the annular chamber, B, the whole arranged within the hub, substantially as and for the purpose herein specified.

### 51,078.—Horse Shoe.—Henry H. Palmer, Rockford, Ill.:

I claim, First, The combination in the shoe of the stationary clips, D, and the movable clips, H, on the plates, F, which are fitted into the dovetail grooves extending across the upper portion of each side of the shoe, and secured therein by set screws, G, substantially as described and represented.

Second, I claim the auxiliary projection, e, on the clip, H. as and for the purpose described.

### 51,079.—Amalgamator.—C. C. Peck, Blackhawk, Col.:

I claim the arrangement of an amalgamating pan, or a series of pans, and a mechanism for agitating the same, so that in connection with a combined longitudinal and vertical or longitudinal and vibrating movement, said pan or pans shall have a reciprocating lateral movement substantially as set forth.

I also claim extending the spider arms over the edge of the pan, thereby holding the pan in position and permitting its easy removal, substantially as set forth.

I also claim the pins or projections, o, extending down into one or more of the pans, substantially in the manner and for the purpose specified.

### 51,080.—Cigar Case.—Charles A. Perry, Elkhorn, Wis.:

I claim as a new article of manufacture, a cigar case or box, constructed substantially as herein shown and described.

[The object of this invention is to produce a case which can be made so cheaply that the same, full of cigars, with the required quantity of matches, can be purchased for the sum that the cigars it contains would cost if purchased without the case, and when the cigars are smoked the case can be thrown away, and this does away with the inconvenience of carrying around an empty cigar case, when one has no opportunity for keeping it filled.]

### 51,081.—Variable Cut-off.—William G. Pike, Philadelphia, Pa.:

First, I claim the arrangement of the plug, B, and the spindle, E, in combination with the adjustable pivots, F F, the whole constructed substantially as herein set forth.

Second, The combination of the rods, W, the single and double arms, T T', the rods, S S', the springs, R R,' and the arm, G, whereby the valve is opened twice at each revolution of the engine, substantially as shown and described.

Third, The combination of the double arm, G, with the spring bumper, L, to adjust the closing of the valve, substantially as shown and described.

### 51,082.—Machine for Dressing and Beaming Warps.—Wm. Potter, and Abial W. Sheldon, Lowel, Mass.:

First, We claim the combination and arrangement of the long center frame, D D, with two or more dressing frames of ordinary length, substantially as herein described and shown, and for the purpose specified.

Second, We claim four guide rolls, 8 9 10 10, or their equivalents arranged as herein specified for the purpose set forth.

### 51,083.—Coffee Pot.—E. Pincus and D. B. Emerick, Philadelphia, Pa.:

First, We claim the combination of the chambers, B and B', partition, I, vessel, E, pipe, G, and tube, J, or its equivalent, the whole being arranged and operating substantially as and for the purpose herein set forth.

Second, The combination described of the vessel, E, with the vessel, F, for the purpose specified.

### 51,084.—Dessicating Eggs, Etc.—Thomas H. Quick, New York City:

First, I claim in dessicating eggs and other substances the use of a hollow revolving cylinder divided into radial divisions, heated from within, whose peripheries are coated with the egg-mass or other substances to be dessicated, substantially as above described.

Second, I also claim the divided stationary shaft, perforated as shown, substantially as above described.

Third, I also claim, in combination, perforating the inner sides of the radial divisions, F, of the revolving cylinder or other body, and perforating the divisions, I J, of the stationary shaft around which the dessicating surfaces rotate, so that the radial divisions are alternately filled with and emptied of the heating medium, substantially as described.

Fourth, I also claim, in dessicating eggs or other substances upon surfaces which are kept in motion, depriving them of the water and moisture which are to be removed, by the use of secondary heat applied within the surfaces on which the egg-mass or other substances are placed, substantially as above described.

Fifth, I also claim, in dessicating eggs or other substances upon surfaces kept in continual motion, heating such surfaces by the use of hot water or steam or other fluid, substantially as described

### 51,085.—Coal Stove.—Lewis Rathbone and William Hailes, Albany, N. Y.:

First, We claim arranging a perforated fire-pot with a grate bottom within a circular stove, having a provision for the admission of air below the point of suspension of said fire-pot, substantially as described.

Second, The combination of an annular horizontal register with a suspended fire-pot which has perforated sides, substantially as described.

### 51,086.—Sewing Machine.—George Rehfuss, Philadelphia Pa. Antedated Nov. 11, 1865:

First, I claim the lever, K, for holding a loop of thread and carrying the same across the edge of the fabric when the said lever is so connected to a permanent part of the machine as to be adjustable, substantially in the manner and for the purpose specified.

Second, The combination of the shuttle carrier, O, the cam wheel, S, and operating lever, Q, the whole being constructed and arranged for adjustment, substantially as and for the purpose herein set forth.

Third, The sleeve, E, adapted to the needle bar and to the stationary arm, B, in the manner described in combination with the devices herein described or their equivalent, whereby the said sleeve and its projection, h, may be put either in or out of operative action, as desired for the purpose specified.

Fourth, The take up motion consisting of the adjustable pin, l, on the needle arm, D, the lever, G, and its arm, k, and tension device, 3, the whole being arranged and operating substantially as and for the purpose herein set forth.

### 51,087.—Process of Shaping and Hardening Articles of Steel.—Wm. Rowland, Philadelphia, Pa. Antedated Nov. 9, 1865:

I claim the process of simultaneously shaping and hardening articles of steel by subjecting them while in a heated state to a gradually applied pressure between cold dies as set forth.

### 51,088.—Snap Link.—Cyrus W. Saladee, Newark, Ohio:

I claim the ring, C, or its equivalent in combination with the snap link, A B, in the manner and for the purpose substantially as shown and described.

### 51,089.—Snap Hook for Whiffletrees.—Cyrus W. Saladee, Newark, Ohio:

First, I claim the snap hook, A, when constructed and operating, in the manner and for the purpose substantially as shown and described.

Second, I claim the spring, O, in combination with the hollow plate, B, and the snap hook, A, in the manner and for the purpose substantially as shown and described.

Third, I claim the plate, B, as a covering from the spring, O, in such manner as to protect the latter from mud and dust, substantially as shown and described.

Fourth, I claim the plate, B, or its equivalent when arranged in combination with the ferrule, F, Fig. 384, in the manner and for the purpose substantially as shown and described.

### 51,090.—Fountain Pen.—Levi M. Sandford, Clinton, Iowa, and James B. Beebe, Morris, Illinois:

I claim the combination of the part or lever, G, supporting the hasps, m, and the spring, F, substantially as described and set forth.

### 51,091.—Child's Exercising Chair and Scale.—Thomas Thedd and Frederick Glockner, Williamsburgh, N. Y.:

First, I claim the combination of the seat, g, vertical bars, m, spiral springs, r', cross bar, n, guides, o, and grooved friction rollers, v, all arranged substantially as set forth. for the purpose specified.

Second, The weighing scale, combined with a child's exercising chair, substantially as herein set forth and shown.

Third, The adjustable bar, w, in combination with the chair seat, supported upon springs, substantially as set forth, for the purpose specified.

### 51,092.—Revolving Fire-arm.—H. Smith and D. B. Wesson, Springfield, Mass.:

I claim the employment of two adjusting center screws, a b, and projection, c, in combination with the revolving cylinder of a fire-arm, substantiatially in the manner and for the purpose described.

Also, removing the bearing for the rear end of the cylinder from the surface of said cylinder to the center screw, substantially as and for the purpose set forth.

[This invention consists in the employment of two adjustable center screws, in combination with the chambered cylinder of a revolving fire-arm, in such a manner that by removing the bearing from the end of said cylinder to the end of the adjusting screw, the chambers can be placed nearer the center of said cylinder, and the size and weight thereof can be reduced, and, furthermore, the friction, while revolving is materially lessened, and, by having both the front and back screw adjustable, the position of the cylinder in relation to the rear end of the barrel can be regulated to give the proper opening between them.]

### 51,093.—Shoe for Car Brakes.—C. H. Sollers and John Rhoads, Harrisburg, Pa.:

First, We claim so constructing a brake shoe and its holder that the shoe can be reversed at pleasure, and secured in its place, without the use of bolt fastenings, substantially as described.

Second, The locking arm, d, applied to the upper end of the holder, A, for holding the shoe, B, in place, substantially as described.

Third, Securing a shoe to its holder by means of dovetail fastenings. and a holding-down lock, d, or its equivalent, substantially as described.

### 51,094.—Ship's Pump.—T. S. Speakman and Noah Hand, Camden, N. J.:

First, We claim the pump barrel, E, with its piston, G, arranged in the hold of the vessel, and operating in combination with the within-described pipes and valves, or their equivalents, substantially as and for the purpose specified.

Second, The combination of the case, M, tube, f, float, N, rod, g, finger, i, and index, s, as arranged in relation to the foregoing.

### 51,095.—Loom for Weaving Embroidered Fabrics.—J. G. Spitzli, Millville, Mass.:

First, I claim the pattern wheel, H, composed of a series of adjustable pins, q, in combination with a suitable mechanism for turning the same, and with oscillating spring arms, to which one or more needle bars are attached, substantially as and for the purpose specified.

Second, I further claim the combination of the pattern wheel, h, needle bar, D, and pins, a2, all arranged and operating substantially as and for the purposes specified.

### 51,096.—Cultivator.—W. W. St. John, St. Louis, Mo.:

First, I claim mounting the beam, A, on the wheel stand, B', the two parts being connected together by means of the bolt, a, or its equivalent, so as to form a swivel joint, for the purpose of allowing the wheel, B, to be turned to either side, to assist in the guidance of the plows, F.

Second, I claim the combination of the wheel stands, B', and frame, A A' A'', and frame, C D D', with the swinging frame, E E' and plow beams, F, as and for the purpose set forth.

### 51,097.—Horse-rake.—A. C. Stone, Steeleville, Pa. Antedated Nov. 13, 1865:

I claim constructing the cleavers of horse-rakes with curved fingers, in combination with giving said fingers a forward movement, by the means described, for the purpose specified.

### 51,098.—Running Gear of Street Locomotives.—Ira C. Story, Cincinnati, Ohio:

First, I claim the vibrating platform, E, friction wheels, O and N, and screw, P, in combination with drawing wheels, C, operating as above described and for the purposes set forth.

Second, in the modified form, the platform, E, rollers, l, and screw, 2, in combination with the driving wheels, C, as above described, and for the purpose set forth.

### 51,099.—Ointment.—Louis Strober, Jersey City, N. J.:

I claim the within-described ointment for piles, composed and mixed substantially as set forth.

[This invention relates to a composition of the simplest kind, which can be prepared in a few minutes, and the effect of which in curing piles is said to be really surprising.]

### 51,100.—Mortising Machine.—James Stufflebern, Milwaukee, Wis.:

I claim, in a machine for relishing the tenons in doors and similar work the arrangement of the reciprocating chisel, D, die, E, stops, G G H, H, and the means of adjusting the table, substantially as described.

### 51,101.—Cider Mill.—J. H. Thomas and P. P. Mast, Springfield, Ohio:

We claim, First, The roller, C, provided with the flanges, c, alternating as shown, in combination with the rollers, E and F, when so arranged that each shall revolve at different velocities.

Second, We claim the adjustable concave turning on journals at the lower end, and located above the roller, F, as and for the purpose set forth.

Third, The metallic side plate, of the grinding case, provided with bearings for the upper roller, C, as shown and described.

### 51,102.—Machine for Trimming Chain Links.—F. Van Patten, Ilion, N. Y.:

I claim the combination of the fixed anvil block and cutter blades, m and n, arranged together and constructed substantially in the manner described and for the purpose specified.

[This invention relates to a new die for trimming chain links, after having been welded, and it consists in the use of a fixed and stationary block or anvil, in combination with a drop-die or cutter, the two being so constructed and arranged with regard to each other that, first, having placed the link to be trimmed upon the anvil, and then dropping the die upon the same, the edges of the link will be evenly and neatly trimmed, the importance of which, in chains, is obvious.]

### 51,103.—Heliographic and Photographic Spectrum for Producing Line Engravings.—Frederick Van Egloffstein, New York City:

I claim, the use of a spectrum for the purpose of producing line engravings, from transparent photographs, substantially as herein described.

### 51,104.—Ore Crusher.—Joel Webster and James G. Morgan, Brooklyn, N. Y.:

We claim the application of a pneumatic spring to the stamper of an ore-orushing machine, substantially as described.

Second. Connecting the pneumatic springs to the cranks which operate the stampers, and guiding the lower ends of the latter so that they will receive an up and down motion and also a vibrating motion, substantially as described.

Third, The employment of a packing for the piston of the pneumatic spring, which is constructed and applied substantially as described.

Fourth, Constructing the piston of the pneumatic cylinder with concave faces and shoulders, i i, adapted to receive an annular concave-convex packing, substantially as described.

Fifth, We claim securing the leather packing of the piston in their places by the raised off sets or shoulders, i i, on the piston, a rod as described.

Sixth, We claim the combination of the movable bed for receiving the ore to be crushed with pneumatic spring stampers, substantially as herein described.

### 51,105.—Scroll Saw.—A. D. Campbell (assignor to David L. Plume), Newark, N. J.:

I claim, First, The adjustable weight, W, applied to the inverted pendulum, L, to operate substantially in the manner and for the purpose as herein described.

Second, The springs, P P, applied in front of and behind the inverted pendulum, to operate substantially as herein set forth.

### 51,106.—Lubricator for Steam Engines.—John Pardoe Ferris, London, England:

I claim, First, The passages, B E and H, for the admission of steam into the chamber, A, and the escape of the oil from said chamber to the parts being lubricated, constructed and arranged, substantially as described

Second, The plug, C, with passage, D, in combination with the steam and oil passages, B E and H, arranged and operating as described.

### 51,107.—Power Capstan.—David N. B. Coffin, Jr. (assignor to himself and Irah D. Spaulding), Boston, Mass.:

In combination with conical gears, h g f e, I claim angular shafts diverging from the axes of gear, h, and the capstan, substantially as and for the purposes set forth.

Also the arrangement of the dogs, n m, ring, p, and its inclined lifters, q v, in combination with the lugs, v t, substantially as described.

Also, compounding the spindle u k, by forming the lower bearing u, on and as part of the bed plate, and then inserting a comparatively light wrought shaft, k, to form the upper bearings, and receive the nut, l, or a pin, substantially as described.

Also, connecting the fulcrum gear, e, to the bed plate automatically, by furnishing each with a double series of opposing inclined surfaces or lugs, substantially as and for the purposes set forth.

### 51,108.—Truss.—Robert E. Downie (assignor to himself and Leonard E. Downie), Delevan, Wis.:

I claim, First, The back pad, A, and rocking bar, B, applied in combination with the springs, C', and pads, D, substantially as and for the purpose set forth.

Second, The hinged arms, C, in combination with the rocking bar, B, back pad. A, and springs, C', constructed and operated substantially as and for the purpose described.

[This invention relates to a truss or supporter provided with a back pad, which is hinged to a rocking bar, in combination with spring arms hinged at their rear ends to said rocking bar, and provided with pads of a peculiar shape, in such a manner that by the combination of said rocking bar, back pad, and spring arms a uniform pressure is exerted on the rupture, and, at the same time, the body of the patient has a free and unrestricted motion in all directions or forms, and in any position, without irritation from any part of the truss, and without danger of causing a displacement of the truss. The iront pads are so formed as to avoid all downward pressure, and to give a more direct and upward pressure, and from a lower point than other pads in use, and also prevent the rupture from pressing out below the pad.]

### 51,109.—Artificial Ivory.—Charles F. Dupper (assignor to himself, John Benz, and Julius Hackert), Bridgeport, Conn.:

I claim the within-described composition for artificial ivory, made of the ingredients herein specified, and mixed together in the manner and about in the proportions set forth.

[This invention relates to a composition of bone dust with certain other ingredients, whereby said bone dust is bleached and transformed into a pliable mass, which can be readily pressed into molds of any desired description, and from which billiard balls and other articles can be made equally as hard and durable as such balls or other articles made of real ivory.]

### 51,110.—Sheathing for Vessels.—Henry Field, Jr. (assignor to himself and New Bedford Copper Co.), New Bedford, Mass.:

I claim the employment for sheathing purposes of sheets of copper, or copper alloys, having a coating formed by oxydation and rolling, substantially as set forth.

### 51,111.—Rake Attachment to Harvesters.—Henry Fisher (assignor to C. Aultman & Co.), Canton, Ohio:

I claim, First, In combination with a rake shank having a horizontal circular motion, a rake head and rake united therewith, so that the rake head and rake, in addition to their circular motion with the shank may have a reaching or forward and backward sliding motion, independent of the shank, and independent of each other, substantially as described and represented, and for the purpose set forth.

I also claim, in combination with a circular and reaching rake, a palm or compresser, which is swung out to aid in gathering the gavel into a compact form before it is delivered upon the ground, substantially as described.

I also claim, in combination with the angular arm, O, for operating the rake, the lowering or recessing of the rear portion of the platform, so that the arm may turn freely and allow the rake to work close to the platform, as described.

### 51,112.—Lubricator for Steam Engines.—Samuel E. Foster (assignor to the Putnam Machine Co.), Fitchburg, Mass.:

I claim the within-described oil feed apparatus, consisting of the cylinder, with its piston, D, and packing, operated by the screw, C, substantially as set forth.

### 51,113.—Drilling Machine.—Anson Hatch, New Haven, Conn., assignor to himself and Wilfred H. Nettleton, Bristol, Conn.:

I claim the upper puppet head F, and its appendages, in combination with the lower pappet head, G, and its appendages, when they are constructed and arranged and made to operate, substantially as herein described.

Second, I claim the upper puppet head, F, in combination with the rear part, A B, and upright, C, when the whole is constructed, combined, and fitted to be attached to the bench, sustantially as herein described.

### 51,114.—School Slate.—Jesse La Bar (assignor to himself and Robert McDowell), Statington, Pa.:

I claim the groove, x, and holes, m and m', communicating with said groove, the whole being made in the corner of a slate frame, for the reception of the wire fastening, n, as and for the purpose herein set forth.

### 51,115.—Knitting-machine Needle.—Isaac W. Lamb (assignor to himself and Alvah Strong), Rochester, N. Y.:

First, I claim a latch or caster, swinging within a slot in a knitting-machine needle, and having no longitudinal movement on its pin, when the extreme front point of such caster is always either within or under the slot in the needle, substantially as and for the purpose herein described.

Second, I claim the combination of a hooked needle with a hinged caster, in such a manner that the point of the caster will be covered in the slot of the needle, at the same time that the point of the hook is covered by the caster, substantially as and for the purpose herein set forth.

Third, In combination with a hinged caster that covers the point of the hook by rising up against the under side of the same, I claim making such hook flexible for the purpose herein explained.

Fourth, I claim extending the rear end of a hinged caster, back of its pin, so as to permit of applying a suitable device back of such pin, to operate the caster when such hinged caster is combined with a hooked needle, in the manner specified in clause second of this claim.

### 51,116.—Straw Cutter.—Robert Leggett and Robert Gittus, Mildenhall, England, assignors to A. B. Childs, Rochester, N. Y.:

We claim, First, The combination of the eccentric disk, E', or its equivalent, with the pivoted knives, E, and guide slots, c, all arranged and operating substantially as and for the purpose shown and described.

Second, The compound pressure plate, G, consisting of the vertically sliding weight, f, and semicircular cap, g, in combination with

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the feed rollers, F, or their equivalents, constructed and operating in the manner and for the purpose substantially as specified.

51,117.—Revolving Fire-arms.—William Mason (assignor to E. Remington & Sons), Ilion, N. Y.:

I claim, First, So combining the base pin, support, and cylinder as that they may be swung out of line with the center of the barrel and frame, far enough to load the cylinder at the rear and eject the empty cartridge cases, substantially as described.

I also claim, in combination, the internal concentric groove near the fore end of the cylinder, the external concentric groove and the eccentric head, on the swinging support, said grooves and head being fitted and held in proper position by the base pin, substantially in the manner and for the purpose set forth.

I also claim the short endwise movement of the base pin, in combination with the revolving cylinder, and the spring, for the purpose of fastening and releasing the cylinder, in and out of the central line barrel and frame, substantially as described.

I also claim, in combination with the base pin, having an endwise motion in connection with a spring, the beveled end thereof and the inclined recess or plane in the frame, for allowing the base pin to yield while entering the frame, and shooting into its catch when in place, substantially as described.

I also claim the stud on the barrel, in combination with the notch and groove in the base pin, for forming a locking and unlocking mechanism for said base pin, substantially as described and represented.

I also claim a non-rotating base pin, in combination with the rotating ejector and cylinder, substantially as herein described.

51,118.—Paint Oil.—William W. Nichols (assignor to himself and Daniel Price), Lockport, N. Y.:

I claim a compound or vehicle for painting, composed of the ingredients herein set forth, combined substantially in the manner and proportions described.

51,119.—Soap.—William Nyce (assignor to Geo. Nyce), Three Rivers, Mich.:

I claim the combination of the above-named materials, in the proportions and manner herein described, for the manufacture of an erasive and medicated soap, for the uses and purposes herein named.

51,120.—Fish Decoy.—Ira B. Quinby, East Boston, Mass., assignor to himself and Edward Low, York, Me.:

I claim as my invention in the above-described apparatus, the combination of the float, A, the glass vessel, E, and the lamp arranged within the said vessel.

I also claim the combination of the socket or cap, C', and the series of rods, D D, or the equivalents thereof, with the float, A, the glass vessel, E, and the lamp placed or suspended therein.

I also claim the combination of the cap, I, and the air tubes, H H, with the lamp, F, and the glass vessel, E.

I also claim the combination of the cap, I, and the air tubes H H, with the lamp, F, the glass vessel, E, and the float, A, for supporting such vessel.

I also claim the combination of one or more shields, M M, with the air tubes, H H, the lamp, F, and the glass vessel, E.

I also claim the combination of the ventilator, K, and its guard, L, with the cap tube, I, the glass vessel, E, and the lamp suspended therein.

I also claim the combination of the conical guard, K, and the air opening or openings, i, with the cap, I, the glass vessel, E, and the lamp, F, arranged in such vessel.

51,121.—Gas Burner.—James Stratton (assignor to himself and John Hinshellwood), Philadelphia, Pa.:

I claim an adjustable gas burner, consisting of the tapered interior perforated cap, C, and the tapered interior perforated tube, a', operating together as described, and inclosed within the external burner cap, B, screwed permanently down upon the base, A, as and for the purpose described.

51,122.—Rotary Steam Engine.—James Torrance (assignor to himself and John George, Jr.), Irwin Station, Pa.:

First, I claim connecting the piston of a rotary engine to the piston wheel, by means of a pivot, and allowing the same to rotate freely round its own axis, substantially as and for the purpose described.

Second, The steam valve, i, fitted into a socket in the main shaft and combined with the steam pipe, g, and ports, j j', q q', substantially as and for the purpose specified.

Third, The arrangement of the revolving valve, i, situated in the interior of the main shaft, D, piston, c, cylinder, C, cams, m, and abutments, K K', all constructed and operating substantially as and for the purpose set forth.

[This invention relates to a rotary engine, the cylinder of which is provided with an annular channel in which the piston travels. Said channel may be round, square, oval or of any desired form or shape, but if it is round the piston which fits nicely in it all round, is made to turn on a central axis so that the same wears even all round and leakage of steam is prevented. The piston is secured to a head which is firmly keyed to the main shaft, and steam is admitted through a pipe secured to a rotary valve which is situated in the main shaft, one of which is bored out for that purpose. The steam pipe being much smaller in diameter than the bore of the hollow part of the shaft, allows the spent steam to exhaust freely through the same end of the hollow shaft through which the steam pipe enters. By turning the valve with a hand wheel attached to the steam pipe, the engine is reversed.]

51,123.—Manufacture of Pottery and Such-like Wares.—Thomas Latham Boote and Richard Boote, Burslem, England. Patented in England Nov. 10, 1864:

We claim as our improvements in the manufacture of pottery and such-like wares arranging the clay or other material employed in or on the molds in such manner that, in making articles of a concave and convex form, each part may receive an equal amount of pressure, substantially as hereinbefore described.

51,124.—Filtering Press.—L. P. R. de Massy, Paris, France:

First, I claim the combination of a perforated casing, B, when used for the compression and filtration of substances contained in the space between the two casings, by the application of fluids under pressure to the flexible casing, substantially as described.

Second, In combination with the above, I claim the cylinder, D, its piston, E, and the inlet and outlet pipes, with their cocks and gate, or the equivalent to the same.

Third, The combination of the cylinder, G, its piston, H, and inlet and outlet pipes, and the cocks or their equivalent, with the outer perforated casing, A, and inner flexible casing, B.

51,125.—Moulds for Casting Metal Safes, Vaults and Similar Substances:

First, The employment and combination of the pyranidical or central core, c, with the surroundings molds, E, each constructed and arranged in the manner substantially as and for the purposes herein described and set forth.

Second, The arrangement of the means herein described or any equivalent thereof, by means of which the said pyranidical or central core is permitted to drop, in the manner and for the purposes as herein described and set forth.

Third, The employment of the surrounding mold, B and E, in combination with the vertical wedged shaped keys, a, or any equivalents therefor, arranged and operated in the manner substantially as and for the purposes herein described and set forth.

Fourth, The combination of the horizontal wedged shape keys or slides, f, with the vertical wedges or keys, a, each being arranged and operated in the manner and for the purposes substantially as herein described and set forth.

Fifth, The mode herein described for making safes and vaults of wrought and cast iron or semi or cast steel in iron or metallic molds, subssantially as herein described and set forth.

## REISSUES.

2,109.—Process for Making Copal Varnish.—Liveras Hull, Charlestown, Mass., assignor to himself and A. Wheeler, Boston, Mass. Patented Nov. 22, 1859:

I claim my new manufacture of varnish, as composed of the gum copal or kowrie, or kauri, camphene, or its equivalent, and alcohol, united in the proportions substantially as specified.

5,110.—Apparatus for Folding Paper Collars.—George W. Ray, and Varnum N. Taylor, Springfield, Mass., assignees of Albert H. Hook. Patented March 7, 1865. Reissued August 22, 1865:

We claim, First, Indenting and folding the collar by means of a blade or folder, upon a yielding or cushioned surface, substantially as herein described and set forth.

Second, The yielding or cushioned folding surface, whether in an inclined or other position, on which the blade acts in folding as herein described in combination with the gauges, m, substantially as, and for the purposes set forth.

2,111.—Screw Press.—Thomas B. Webster and Thomas Gannon, New York City, assignees of Thomas B. Webster. Patented July 25, 1865.

First, In a double press having its followers arranged to work toward and from each other, we claim the arrangement of the two followers and their connections, and of the bearing of the screw, whereby the said bearing is rendered self-adjusting, or free to assume a central position between the followers, and each follower serves as the abument to the other in the pressing operation, substantially as hereindescribed.

Second, In a press provided with a right and left-hand screw spindle, E, we claim the gear wheels, F G, and cranks, L I, or their equivalents in combination with heads, C, detachable nuts, J J, toggle arms, K K, and followers, C C, situated on opposite sides of the spindle, all as herein shown and described.

Third, The eccentric shafts, d d, geared together by cog-wheels, f f, and operated by a hand wheel, g, or its equivalent, in combination with the jaws, b b, spindle, E, and followers, C C, constructed and operating substantially as and for the purpose specified.

2,112.—Construction of Safes.—Lewis Lillie, Troy, N. Y. Patented July 15, 1851, and extended seven years:

First, I claim the employment of wrought iron and cast iron, in combination, the same forming a safe, vault, or door, in the manner and for the purposes substantially as herein described and set forth.

Second, I also claim a safe, vault, or door, constructed of a series of wrought-iron bars and surrounded by cast iron, in the manner substantially as and for the purposes herein described and set forth.

Third, I also claim a safe, vault, or door constructed of boiler-plate iron, perforated, and riveted together by means of the rivets, b, and cast iron, in the manner and for the purposes substantially as herein described and set forth.

Fourth, I also claim a safe, vault, or door containing cast iron chilled or hardened in the manner and by the means and for the purposes substantially as herein described and set forth.

Fifth, I also claim a safe, vault, or door constructed burglar proof, in the manner and by the means substantially as herein described and set forth.

## DESIGNS.

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2,222.—Cases and Nosings of Locks.—Samuel M. Richardson, New York City.


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STEAM ENGINES, EXPANSION REGULATING, not excelled in economy of fuel, simplicity, and thorough ness of construction.

WATER WHEELS—Rider's Patent Turbine—with valuable improvements—the best in use for general manufacturing purposes.

WILDER' PATENT SALAMANDER SAFES—the most reliable Fire-proof Safe in use.

CAST-STEEL SLEDGES, Stone Hammers, Etc.

All on hand and made to order, at lowest paying prices, and warranted. GEO. T. McLAUTHLIN & CO
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THE HARRISON BOILER—A SAFE STEAM BOILER.—The attention of manufacturers and others using steam is confidently called to this Patent Steam Generator, as combining essential advantages in Absolute Safety from explosion; in cheapness of first cost and cost of repairs; in economy of fuel, facility of cleaning, and transportation, etc., not possessed by any other boiler now in use.

This Boiler is formed of a combination of cast-iron hollow spheres—each sphere eight inches external diameter, and three-eighths of an inch thick. These are connected by curved necks, and held together by wrought-iron bolts with caps at the ends.

The form is the strongest possible; its strength to resist pressure very great—unweakened by punching or riveting, which lessens the strength of wrought-iron boiler plates about forty per cent. Every boiler is tested by hydraulic pressure at 500 pounds to the square inch. It Cannot be Burst Under Any Practicable Pressure.

It is not affected by corrosion, which so soon destroys the wrought-iron boiler. More explosions are traced to this cause than any other.

It has economy in fuel equal to the very best boilers now in use, arising from the large extent and nearness of its heating surface exposed to the direct act on of the fire.

It gets up steam quickly from cold water and with little fuel.

It produces very dry superheated steam, and is not liable to priming or foaming.

It is easily transported, can be erected by ordinary workmen, and is readily cleaned inside and out. It requires no special skill in its management.

Under ordinary circumstances, it is kept free from permanent deposit by merely blowing the water entirely out once a week.

Injured parts can be renewed with great facility, as they are uniform in shape. A boiler can be increased in size to any extent by simply adding to its width, and being a multiplication of a single form its strength remains the same.

It has less weight, and takes much less ground area than the ordinary boiler, without being increased in hight.

It is applicable to ocean and river steamers, and may be used as a radiator, with steam or hot water for warming buildings. It can also be used as a condenser.

They can be sold at less cost than ordinary boilers.

Harrison Boilers can be seen in use at the following places:—

Philadelphia—At S. W. Cattell's Woolen Mill, Spruce and Twenty-fifth streets (two boilers); William Sellers & Co 's Foundery; Stephen Robbins's Rolling Mill (two boilers); Lewis Taws' Brass Foundery; Girard Flouring Mill, Ninth street; G. W. Simons, Jeweler, Sansom street; Christian Baltz, Mince-meat Factory, Kensington; James B. Rodgers, Priuter, No. 54 North Sixth street; H. C. Oram & Co.'s Foundery; McKeone, Van Haagan & Co.'s Soap Manufactory; H. C. Bower's Chemical Works, Gray's Ferry Road (two boilers); the House of Refuge.

West Philadelphia—The Pennsylvania Hospital for the Insane; Murphy & Allison's Car Factory.

Frankford, Philadelphia—Richard Garsed's Cotton Mills (two boilers).

Germantown, Philadelphia—Selsor, Cook & Co.'s Tool Factory; Elias Birchall, Armat Mills.

Manayunk, Philadelphia—American Wood Paper Co.'s Mills (three boilers).

Pottsville, Pennsylvania—At G. W. Snyder's Foundery.

Schuylkill County, Pennsylvania—At the Tremont Co.'s Coal Mines (two boilers); at the Salem Coal Mines (two boilers).

Pittsburgh, Pennsylvania—Park, Brother & Co.'s Black Diamond Steel Works; Gaskill & Butler's Rolling Mill.

Camden, New Jersey—The Camden and Atlantic Railroad's Machine Shops.

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Brooklyn, New York—The Fiber Disintegrating Co 's Paper Works.

Williamsburgh, New York—Charles Pfizer & Co.'s Chemical Works (two boilers); Charles Illig's Brewery.

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Worcester, Massachusetts—The Earle Stove Company.

Hillsboro, Ohio—C. S. Bell's Mill.

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St. Louis, Missouri—The Carondelet Paper Works of the Fiber Disintegrating Company (two boilers).

Drawings and Specifications furnished free of charge. Address

JOSEPH HARRISON, JR.,
Harrison Boiler Works, Gray's Ferry Road,
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FACTORY FOR SALE.—A LARGE FACTORY, SITUATED in the village of Yonkers, Westchester Co., N. Y., within sixteen miles of the New York City Hall. The main building is 384 feet long and 40 feet wide. Blacksmith Shop and Boiler Room, 300 feet long, beside other outbuildings. New Steam Engine, 225 horse-power; 4 Steam Boilers; 3 Pumps; Steam-heating Apparatus; Gas Fitting complete, and main Shafting and Pulleys. Also, nine large Brick Dwellings, together with a Water Grant from the State, extending nearly 500 feet into the Hudson River. The main building is one of the lightest and pleasantest shops in the whole country. For full particulars and maps of the property apply to FREDERIC A. COE, 170 Broadway, N. Y., or T. B. Stout, Treas., Yonkers, N. Y.
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TO INVENTORS.—THE ADVERTISER WILL MANUFACTURE or introduce a new and useful article or manufacturing process—simple and staple articles preferred. Address immediately A. B. HOLMES, No. 133 Fulton street, New York. 22 2*

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GEO. GEER.
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Price, $7,500. Title beyond dispute.
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CHIEF QUARTERMASTER'S OFFICE, U. S. M. R. R.,
NASHVILLE, TENN., October 31, 1865.

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Two Flat Cars, 5½ feet gage.
On November 25, 1865, at the yard of the Jeffersonville Railroad Company, Jeffersonville, Ind.,
Nine Flat Cars—Gage, 4 feet 8½ inches.
On November 27, 1865, at Louisville, Ky.,

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| 311 Car Wheels, | 43 p's. Wheels and Axles, |
| 217 Old Axles, | 1 Tender, |
| 1 Smoke Stack, | 1 Engine Truck, |
| 1 Pair Drivers, | 4 Springs, |
| 1 Parallel Rod, | 1 Bed and Frame, |
| 4 Hand Cars, | 14 Truck Cars, |

50,000 Pounds of Scrap Iron.

On December 1, 1865, at Memphis, Tenn., the entire stock of the U. S. Military Railroad Supplies remaining on hand at that place, consisting in part as follows:—

Eighty tuns Assorted Iron,
Eight hundred tuns Scrap Iron,
Eight tuns Assorted Steel,
One tun Pig Lead.

And a general assortment of Small Stores, suitable for railroads.

On December 11, 1865, at Nashville, Tenn., the entire stock of new and serviceable Stores of the U. S. Military Railroad remaining on hand at the General Supply Store, consisting in part as follows:—

Twenty thousand Axes,
One thousand tuns Assorted Bar Iron, round, square, hfrd., Angle,
Eighty tuns Boiler and Tank Iron,
Thirty-five tuns Assorted Steel,
Three hundred tuns Scrap Iron, wrought and cast,
Twenty five thousand pounds Engine Brass Castings,

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| Gas Pipe, | Heating Stoves, |
| Brass Pipe, | Gas Fixtures of all kinds, |
| Spring Balances, | Oil Cups, |
| Shovels, | Brass Cocks of every description, |
| Hatchets, | Globe Valves, all sizes, |
| Nuts, | Claw, Lining, and Tamping Bars, |
| Washers, wrought and cast, | Iron and Copper Rivets and Burrs, |
| Nails and Spikes, | Sheet Copper and Brass, |
| Mallets, | Chains and Rope of all sizes, |
| Sash, Glass and Paint of all kinds, | Blocks, Tackle and Snatch, |
| Railroad Lamps, | Kelly's Head Lights, |
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Full Sets of Carpenters, Blacksmiths, and Saddlers' Tools, Rubber Car Springs, Belting Gum, and Leather, Files, Buts, and Screws, Tinware of all kinds; and almost every article suitable for railroad operations; all of the very best quality. Also,

Three Large Lathes, Stevens & Bro. manufacturers,
Two Planers, Sellers & Co. manufacturers,
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Two Fan Blowers, medium,
One Upright Engine, 8 horse-power,
One Trip Hammer and Engine, Howell's patent,
One Broomfield Steam Hammer,
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Will also be sold at the same time, a large amount of serviceable and second-hand Railroad Tools of all kinds, consisting of Carpenters' Tools, Wheelwright Tools, Blacksmiths' Tools, Machinists' Tools, Stoves and Pipe, Rope, Chains, Etc.

Terms Cash, in Government funds.

Catalogues of the materials to be sold in Nashville can be obtained by application to Capt. S. R. Hamill, A. Q. M., and at Memphis on application to Capt. John Parks, A. Q. M.

The attention of dealers and Railroad Companies is particularly invited to this sale.

Sales will commence at 9 o'clock, A. M., on each day, and continue daily until all the property is disposed of. F. J. CRILLY,
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There is no complex machinery in its construction, and it can be manufactured as cheap as the ordinary wooden seat.

Can be placed in any Water Closet in thirty minutes.

State, County, City and Shop Rights for sale.

For Descriptive Circular and full particulars address the inventor,
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No works in the country presents stronger inducements for profitable investment. They will be sold on reasonable terms for cash, or on time, and immediate possession granted. Address
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### The Action of Light upon Sulphide of Lead.

A paper, "On the Action of Light upon Sulphide of Lead, and its bearing upon the Preservation of Paintings in Picture Galleries," was read by Dr. D. S. Price at the meeting of the British Association. The author's attention was directed to this subject by observing that, in the cases in the South Kensington Museum which are painted with white lead, substances which emitted sulphurous vapors did not cause a darkening of the surface of the case, excepting where it was protected from the direct influence of light. A number of experiments was then tried as to the action of light upon sulphide of lead produced by the action sulphureted hydrogen upon lead paint. A board of painted white with white lead was exposed for several hours to the action of sulphureted hydrogen, until the surface had acquired a uniform brown color. Plates of glass of different colors were then placed upon the painted surface, one portion being at the same time covered with an opaque medium, and another left entirely exposed. The board was then placed facing the light. The glasses employed were red, blue, yellow (silver), violet, and smoke-color glass. The results exhibited were, after an exposure of eight days, and showed that the parts of the board directly exposed to light were bleached; those protected by an opaque medium were not acted upon; while with the glasses of different colors intermediate effects were produced—those of the violet glass being most decided. Drying oils in conjunction with light rapidly bleach sulphide of lead, and boiled oil effects the bleaching still more rapidly. When water color is used bleaching takes place, but much more slowly than in the case of oil. After quoting authorities, stating that generally light was advantagous to the preservation of pictures, Dr. Price showed a striking illustration of this fact. He had a picture painted, and then exposed it to the action of sulphureted hydrogen, until it became sadly discolored, and, to all appearance, destroyed. Some strips of paper were laid across the picture, so as to cover some parts. The picture, thus partially covered, was exposed to light for a long time. The result, as shown at the meeting, was very curious indeed, the parts of the picture exposed being perfectly restored, while those protected by the paper remained still discolored. From his experiments he came to the conclusion that it was advantageous to have picture galleries well lighted, especially where, as in towns, the atmosphere was charged with sulphur compounds, and that it was quite a mistake to have curtains placed in front of pictures, with a view to their protection. In the course of his communication Dr. Price referred to the use of zinc paint for houses, and considered it likely to be acted upon, as the paint was rendered soluble by the acids contained in the atmosphere of towns.

### Correction of Ship's Compasses at Sea.

M. Faye suggests to the Academy of Sciences at Paris, a method of determining at any time the error of the compass aboard a ship. This is done by attaching to the ship's log, which is suitably modified as to inclends and form, a compass so arranged that at any moment it may be stopped, and its direction thus registered. The log is towed in the wake of the ship, and at a sufficient distance to be out of reach of its magnetic influence, and when it has taken the true direction of the ship, which, if of proper shape, it will soon do, the compass is registered, hauled aboard, and read. The proposition assumes importance from the perpetual variation of the magnetic constants of iron vessels and sea, and the resulting impossibility of perfect correction of compasses.

In the course of his communication, M. Faye records a curious experiment, which is worthy of repetition and study: Dissolve in an acid, soft iron devoid of any magnetic coercive force, and then deposit it, by a galvano-plastic process, in a thin film upon a surface of a plate of copper, as is done in coating copper plates with iron, to give them greater endurance. This thin coating of iron, chemically pure, will possess so strong a coercive power that I have heated a plate thus prepared to the melting point of copper without destroying the magnetism which I had before given it.

### The Compasses of the "Monadnock."

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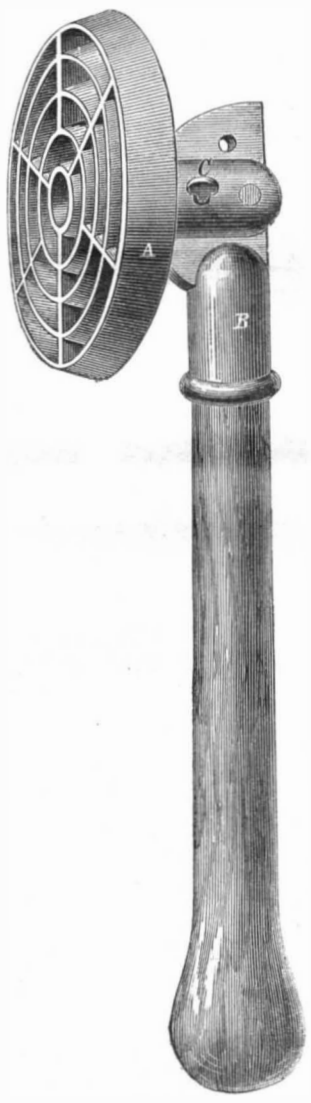


designed to pound beefsteaks with, in order to crush such as may be refractory, and so tough as to defy the sharpest fangs. The instrument is made of cast iron, and consists of a circular grating, A, attached to a socket, B, the whole being secured to a wooden handle. The circular grating is fastened to the socket in a peculiar manner, and so that it may set either at right angles with the handle or turn up vertically, like a churn dasher. In this latter position it is convenient to mash vegetables, such as potatoes, turnips, squash, and the like. The manner of securing the head in either position is by a pin, C, as shown. This pounder does not mar the appearance of the steak, as many do, and no one could tell after the process that the steak had been beaten.

It was patented through the Scientific American Patent Agency, Oct. 31, 1865. For further information address John A. McNeil, Grand Rapids, Mich.

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